

SOUTHERN POWER AND INDUSTRY

Ad Index, page 116

JANUARY, 1953

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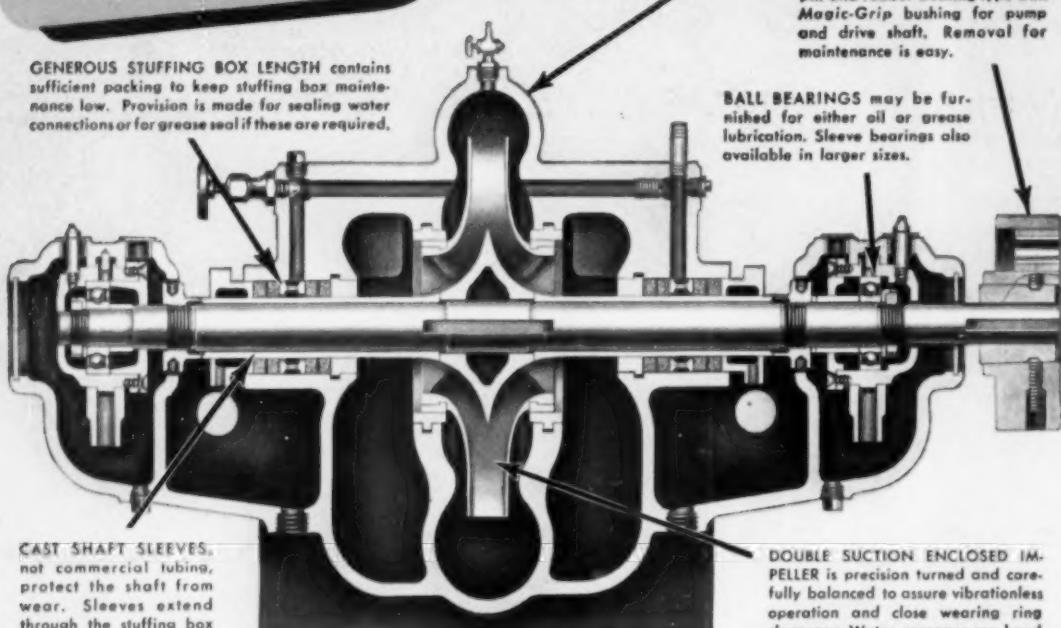
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ALLIS-CHALMERS Double Suction PUMPS

GENEROUS STUFFING BOX LENGTH contains sufficient packing to keep stuffing box maintenance low. Provision is made for sealing water connections or for grease seal if these are required.



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Sound Selling vs. Smart Talk

Today, essentially, all of the chemical companies have established technical service and sales-supporting technical work. One corporation has 25 laboratories devoted to this type of work supported by 29 field laboratories. The total investment by the industry in such facilities, must run well into the tens of millions of dollars, which is one measure of how importantly the industry regards the sales function.

It is now estimated that 70% of the average chemical company's sales staff is technically trained compared with probably less than 25% only 20 years ago and an insignificant percentage 30 years ago. This current mode of selling is epitomized in the slogan of one chemical manufacturer, namely, "Serving Industry through Practical Applied Science."

From an article: "Selling . . . Its Importance in the Chemical Industry," by J. Warren Kinsman, Vice-President, E. I. du Pont de Nemours & Co., Wilmington, Del., in Chemical Engineering Progress.

Nalco

Nalco appreciates the use of its slogan, "Serving Industry through Practical Applied Science", as an example of the modern approach to chemical sales. 100% of Nalco's field service representatives are technically trained to help industry make full practical use of the chemicals and methods developed by the Nalco Laboratories: Water, Microbiological, Physical Chemistry, Organic Chemistry, Corrosion, Micrography, Metallographic, Experimental Boiler, Combustion, Oil Treatment, Paper, Ion Exchange, Weed Control, Production Control.

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TUBULAR AND HOT ROLLED PRODUCTS
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SOUTHERN POWER AND INDUSTRY

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1953

NBP



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Facts and Trends

FOR SOUTHERN INDUSTRIAL AND POWER EXECUTIVES

January, 1953

- INDUSTRIAL PLANT ELECTRICIANS will be especially interested in two of the feature articles in this issue of SP&I. Both discussions will help plant men become more intimately acquainted with the electrical equipment in their charge.

The report on the recent Piedmont-Carolina "Electrical Equipment Conference" covers operating capabilities of a-c motors, starting with long acceleration, typical electrical problems and their remedies, and a summary of an informative panel discussion.

"Electrical Equipment Fundamentals"—by A. T. Lohkamp, Supt. of Power, Pasco Packing Co., Dade City, Florida—is the first of a series of seven "Question and Answer" articles to help the plant electrician. Subsequent discussions will cover distribution and controls, synchronous motors, three phase induction motors, single phase motors, technical and design data, and selecting generators and motors.

- CAUSTIC EMBRITTLEMENT INVESTIGATIONS at high magnification—2000x—was featured on pages 73-74 of our December issue. It is believed that these unusual photomicrographs show, for the first time, the initial or embryo stages of the apparent encircling action taken by the embrittlement crack. Mutual Boiler and Machinery Insurance Company engineers substantiated past experiments by Professor Charles E. Weir of the University of Glasgow on the mechanism of caustic embrittlement.

The theory is that the polarity existing between the disordered structure of grain boundaries and the orderly lattice structure of the grains, under proper conditions of stress and sodium hydroxide concentration, results in a flow of ions from the grain boundaries into solution. The progressive action leaves intercrystalline voids or cracks.

- GAS TURBINES are now being successfully used to pump natural gas through pipelines. The first of twenty-eight 5000 hp G-E gas turbines for the El Paso gas transmission system between West Texas and California has been placed in operation at Cornudas, Texas. Flow of gas through the lines will be increased about 300 million cu ft/day. The new gas turbines will operate centrifugal pumps to obtain the increase.

The El Paso system is now using stations with reciprocating pumps at about 100 mile intervals along the line. These will continue to be used. Gas turbine stations are being inserted at about 30 mile intervals between the existing reciprocating stations. Operating cost of the new stations is expected to be less than the cost of present reciprocating stations, because they will require less manpower for operation and maintenance.

(Continued on page 6)

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a choice of
packing
rings*

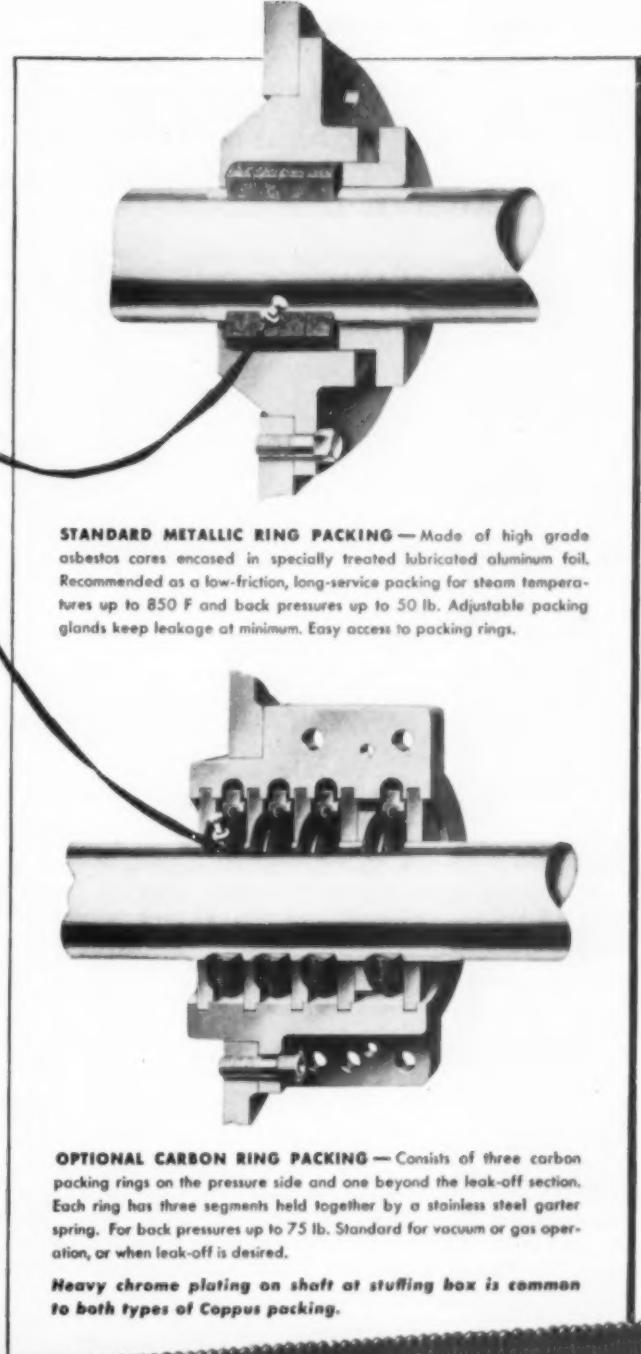
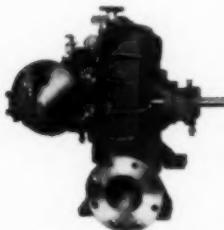
*Coppus Turbines ranging from 150 hp
down to fractional in 6 frame sizes*

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When you buy turbines rated close to your exact horsepower needs, you save plenty of money. That's because turbines are generally priced in proportion to their size. The wide range of sizes of Coppus Turbines promises purchasing economy for you from the 150 hp size down to the smallest. As for operating and maintenance economies, you get them, too, from such other features as: greater number of manually operated valves for individual control of steam nozzles; replaceable cartridge-type bearing housings and others. For complete details . . .

WRITE FOR BULLETIN 135

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REGISTER



OPTIONAL CARBON RING PACKING — Consists of three carbon packing rings on the pressure side and one beyond the leak-off section. Each ring has three segments held together by a stainless steel garter spring. For back pressures up to 75 lb. Standard for vacuum or gas operation, or when leak-off is desired.

Heavy chrome plating on shaft at stuffing box is common to both types of Coppus packing.

COPPUS "BLUE RIBBON" TURBINES

facts and trends (continued from page 4)

- THE FLOOR PROBLEM in an increasing number of industrial plants is being solved by employing the Kalman "absorption process"--a floor topping which has high density and provides a smooth, hard, and tough surface for constant heavy-duty usage.

In the method the major causes of concrete dusting have been eliminated. The high density floors are "impervious" to oil spillage, provided the surface is given normal care. Maintenance costs are low as only sweeping and occasional washing are necessary. An illustrated case history will be carried in an early issue of SP&I.

In the absorption process, a grout coat of cement is applied to the under-slab. The "blotting" material is covered by a layer of dry cement to aid in withdrawing the water to the proper specification. Blotting material is removed at the proper time. Machine trowel is applied to the topping several times after a thorough compacting, and a smooth, even, dust-free surface is obtained by final hand troweling.

- ARTIFICIAL RESPIRATION METHODS--the "arm-lift back-pressure" and the "hip-lift back-pressure" methods of reviving drowning and electrical shock victims have proved more effective than the widely-used Schaefer system, but few workers have been instructed in their use.

The National Safety Council's new visual aid—"Two Methods of Artificial Respiration"—provides a ready means of training small groups. Consisting of twelve spiral bound pages, 18 x 24 in., the safetygraph can be set on any flat surface and opened to form an easel. For information and prices on the ready-to-use packaged training aid, write the National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.

- THERE IS NO BETTER BAROMETER of Southern industrial and scientific progress than the remarkable growth of chemical employment, emphasizes James F. Crist, Vice President of the Southern Company, Birmingham. The South's booming chemical industries now employ more than 11,000 professional chemists, according to the first phase of a survey by the Southern Association of Science and Industry. Mr. Crist is the SASI President.

Texas leads the South in chemical employment with a total of 2,048 chemists, of whom 558 are employed in the petroleum industry. Maryland holds second place with 1,664 chemical scientists; Tennessee follows with 1,420; Virginia 982; North Carolina 833; and Louisiana has 724.

- AS A SERVICE to Southern and Southwestern industrial and utility executives, SP&I is furnishing without charge, reprints up to five (larger quantities at cost) of the notable series of articles on problems of business and government now being featured in each issue.

In the December issue, Laurence F. Lee, President, Chamber of Commerce of the United States, asked HOW MUCH GOVERNMENT SHALL WE HIRE? In this issue, Senator Harry F. Byrd discusses THE PROBLEM OF GOVERNMENT SPENDING.

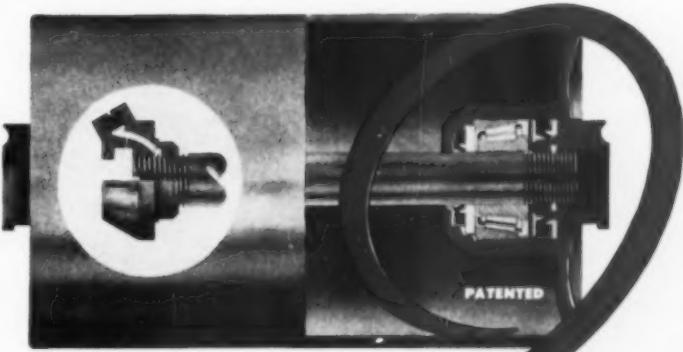
These are discussions on the economic "facts of life" by Americans of national prominence. We continually emphasize that it is our responsibility—yours and ours alike—to help spread a better understanding of fundamental economic facts among our associates.

Write the editors for additional information on any of the above items.
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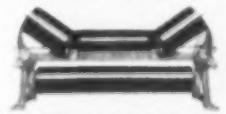
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NEW EQUIPMENT and SUPPLIES for the Plant Engineer and Operating Force

Pre-Printed Tape for Plant Layout Planning

A-1 LABELON TAPE COMPANY, INC., 450 Atlantic Ave., Rochester 9, N. Y., announces the production of pre-printed adhesive tape to use in plant layout planning.



Pressure sensitive tape of the Labelon Tape Company eliminates drafting of repetitive symbols.

Not only is the tedious initial drawing of repetitive symbols eliminated, but changes in temporary layouts can be made instantly by simply stripping the tape from its original position and placing it wherever wanted. No redrawing or erasing is ever necessary. Since the tape sticks without moisture, it can be stripped off repeatedly without leaving a mark or losing its adhesive quality.

All standard symbols for walls, aisles, conveyors, monorails, center lines, columns, shafts, stairways, service lines, railroad tracks, sidings, colored arrows for material and process flow, etc., are available in either 324 in. or 648 in. rolls, scale $\frac{1}{4}$ in. to 1 ft, in opaque or transparent types. The opaque types are used for photocopying; the transparent for reproduction on standard ammonia vapor machines.

A selection of 15 symbols and 20 different rolls may be obtained in kit form.

Free additional information is available to readers of SP&I. Circle the item code number on one of the reader service post cards provided on page 17-18.

Spiral-Taper Pipe and Conduit Reamer

A-2 THE RIDGE TOOL COMPANY, Elyria, Ohio, has recently added to its line of pipe tools the new "Ridgid" spiral 2-S pipe reamer which is said to cut inside burr from pipe and conduit clean and fast with minimum effort or pressure.

The new tool cuts holes in sheet metal readily, smoothly, and without chatter. Reamer capacity is $\frac{1}{8}$ in. to 2 in. It is furnished with ratchet handle, or spiral reamer unit alone may be purchased for use in the

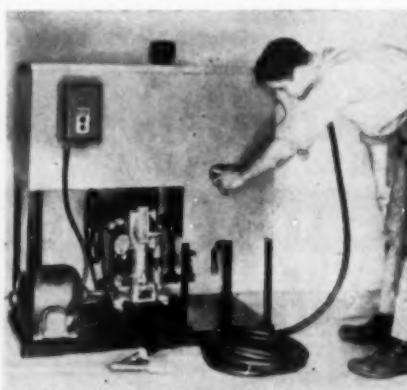


ratchet handle of the company's No. OOR threader.

Heavy Duty Cleaning Unit

A-3 LIVINGSTONE ENGINEERING COMPANY, 100 Grove St., Worcester 5, Mass., has introduced a powerful, new jet cleaner known as the Speedyelectric Hydrafjet. The manufacturer emphasizes that the new cleaner literally blasts away the hard-to-get-at encrusted dirt, grease and grime from road building machines, tractors, trucks, tanks, locomotives and heavy industrial processing equipment.

Where central plant steam is continuously available, even at low pressure, the Hydrafjet can be easily installed requiring only connections to existing steam lines and electric power sufficient for a 3-hp motor. If central plant steam is not available, a Speedyelectric boiler will provide a safe, dependable source of "steam at the flick of a switch."



Livingstone Engineering Company's Speedyelectric Hydrafjet — a heavy duty steam cleaner.

Four to eight gallons of scalding hot soap and water per minute at nozzle pressures up to 600 psi provide, under finger tip control of the operator, a powerful pulsating hydraulic jet. To further accelerate cleaning action, suitable detergents or solvents may be introduced intermittently or continuously in any desired, automatically controlled concentration.

(Continued on page 10)

Engineered

-to stay modern longer!

By consistently providing values that go beyond specifications, Springfield Boiler Co. has earned for itself a record of building steam generating units that *last longer, stay modern longer!* One of these important values is the soundness of engineering underlying Springfield designs. Long a leader in developing and pioneering advances in boiler design, Springfield engineering is balanced by a sense of responsibility that has come from a vast background of experience and more than sixty years of specialization in the boiler field.

Springfield produces a complete range of steam generating equipment... ANY SIZE... ANY PRESSURE... ANY TEMPERATURE... AND FOR ANY FUEL. Your inquiry will receive prompt attention. See our nearest representative or write.

SPRINGFIELD BOILER CO.

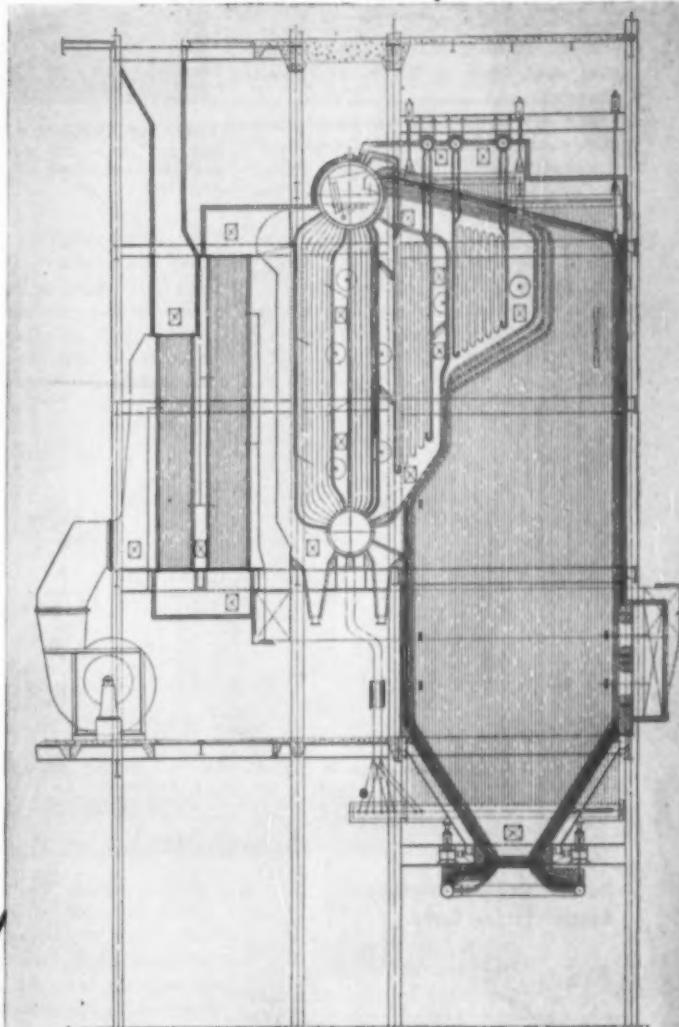
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SUPERHEATERS • DESUPERHEATERS • AIR HEATERS
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OPERATING PRESSURE—875 psig.

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FUEL—Gas and oil. Future, pulverized coal.

SPRINGFIELD
Steam Generating
Units

new equipment (continued)

For more data circle item code number
on the postage free post card—p. 17

Angle-Type Air Tool Drills $\frac{1}{4}$ " Holes at 90°

A-4 KELLER TOOL COMPANY, Grand Haven, Mich., has announced a series of three new angle-type drills powered to drill holes in aluminum or brass from $9/16$ in. up to $\frac{1}{4}$ in. diameter, and in mild steel from $\frac{1}{8}$ in. to $11/16$ in. diameter.

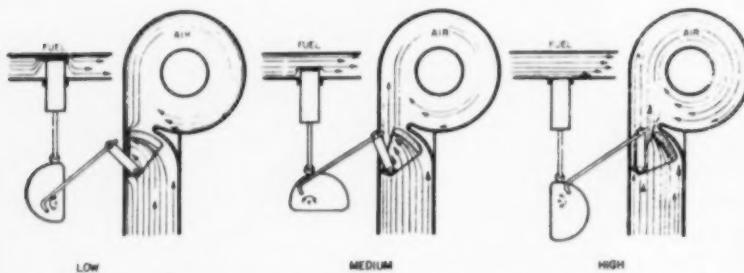
The new drills have the speed necessary when drilling light metals, and the power needed to drive large drills. Stalling under heavy load does not injure the air motor in any way.

The 11C series comprises three different angle attachments, all interchangeable, so that 15 variations of speed and chuck size are available to meet any requirement within the stated range. Parts are also interchangeable.



Keller Tool Company's 11C series of angle-type drills are designed for close quarter work where larger size drills are required.

Other construction features include bevel gears mounted on ball thrust and roller bearings to assure maximum efficiency in transmitting power to the drill spindle; and neoprene seats on the control valves which provide permanently airtight seals.



An adjustable cam controls the fuel valve and an adjustable damper linkage controls the air supply to the Orr & Sembower Voriflow burner for uniformly high efficiency within the operating range from 30 to 100 per cent of full boiler load.

Device for Modulating Burner Firing Rate

A-5 ORR & SEMBOWER, INC., Morgantown Rd., Reading, Pa., announce an adjustable cam and linkage control to maintain fuel/air ratio on Voriflow burners.

Company emphasizes that boilers larger than 50 hp should incorporate some method of low-fire starting, modulating the burner firing rate to accommodate variable steam demand. For both cleanliness and economy, these intermediate firing rates must be maintained at uniformly high efficiency by properly proportioning air and fuel to the burner across the entire operating range.

The fuel and air ratio to the Voriflow air atomizing oil and pre-mix gas burner is thus correctly proportioned for uniform efficiency at all inter-

mediate points. The mechanism is an adjustable cam which positions the fuel valve and an adjustable linkage which positions the air damper. These adjustments are set and locked during factory firetesting while checking against actual flue gas analyses and stack temperatures at a large number of check points.

Thereafter during actual operation both fuel and air at any specific firing rate are correctly proportioned for efficient operation with correct CO₂ content and stack temperature of the flue gas.

Circle the above code number on the page 17 coupon post card for your complimentary copy of Bulletin 1218 describing in detail Powermaster packaged automatic boilers equipped with Voriflow air atomizing oil and pre-mix gas burners.

Dual-Stage Oil Burner

A-6 NATIONAL AIROL BURNER Co., 1284 E. Sedgley Ave., Philadelphia 34, Pa., has announced the development of a new dual stage burner combining steam and mechanical atomization, and said to have the inherent advantages of both systems of atomization.

Oil entering the burner is first mechanically atomized in an internal swirl chamber. After leaving the mechanical stage, the partially atomized fuel is sprayed into a mixing chamber where it is further atomized by steam. Capacities from 80 to 300 gph have been obtained.

Heavy Duty Lift Truck

A-7 THE TRACTO-LIFT Co., 2011 Baltimore Ave., Kansas City, Mo., announces the addition of the "Power King" series to their line of heavy-duty fork lift trucks.



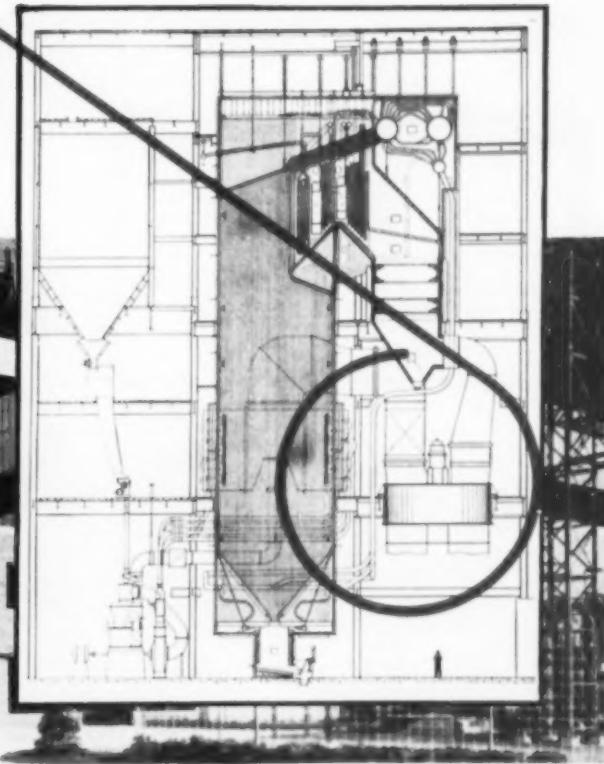
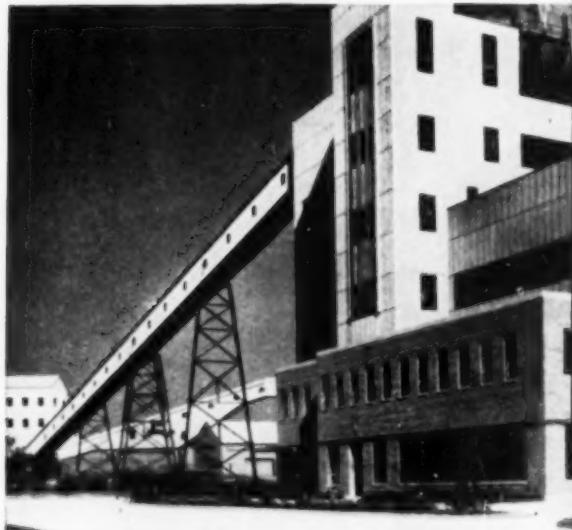
The three new models have more than twice the capacity of standard models. The design is a relatively new development in materials handling equipment, featuring over-size pneumatic tires on a basic tractor unit, for maximum traction and power. Because of its ability to travel at tractor speeds, maximum maneuverability, underneath clearance, climbing power, and incorporation of the principle of flotation for travel in sand and mud, the Tracto-Lift is especially suited to the storing or stacking of bulky materials.

(Continued on page 100)

All Boilers at New Plant Yates of the Georgia Power Company

equipped with

LJUNGSTROM AIR PREHEATERS



Geared to provide increasing facilities to keep pace with Georgia's growing power demands, Georgia Power Company's new Plant Yates Station is now producing 200,000 kilowatts with a third 100,000 kilowatt unit scheduled to go in service this fall. The station was designed and engineered by Southern Services, Inc., of Birmingham.

Each 100,000-kw turbine-generator in this new plant is powered by a Combustion Engineering-Superheater Steam Generator, designed for pulverized coal firing, and natural gas as an alternate fuel. Each C-E Boiler generates 975,000 pounds of steam per hour at 1325 psi and 950 F.

All of these modern steam generating units have been designed to incorporate two Ljungstrom Air Preheaters. These Ljungstroms are designed to preheat incoming combustion air to 655 F, and cool stack gases to 300 F.

Plant Yates is another example of the widespread acceptance of the Ljungstrom Air Preheater — by boiler manufacturers, consulting engineers, and utilities. Since the war, over 285,000,000 pounds of steam capacity per hour have been designed to incorporate the Ljungstrom . . . another proof that Ljungstrom Air Preheaters are standard equipment for high efficiency steam generating units.

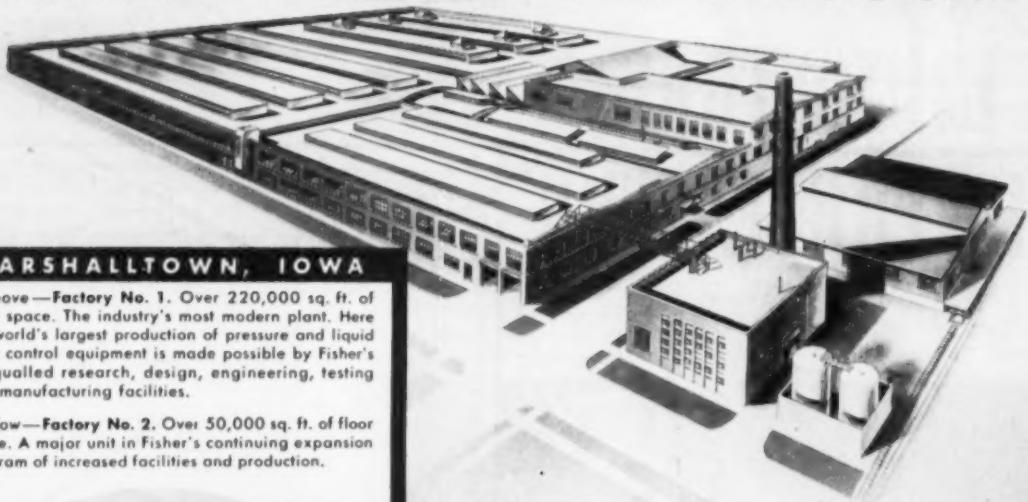
THE Air Preheater Corporation

60 East 42nd St., New York 17, N. Y.

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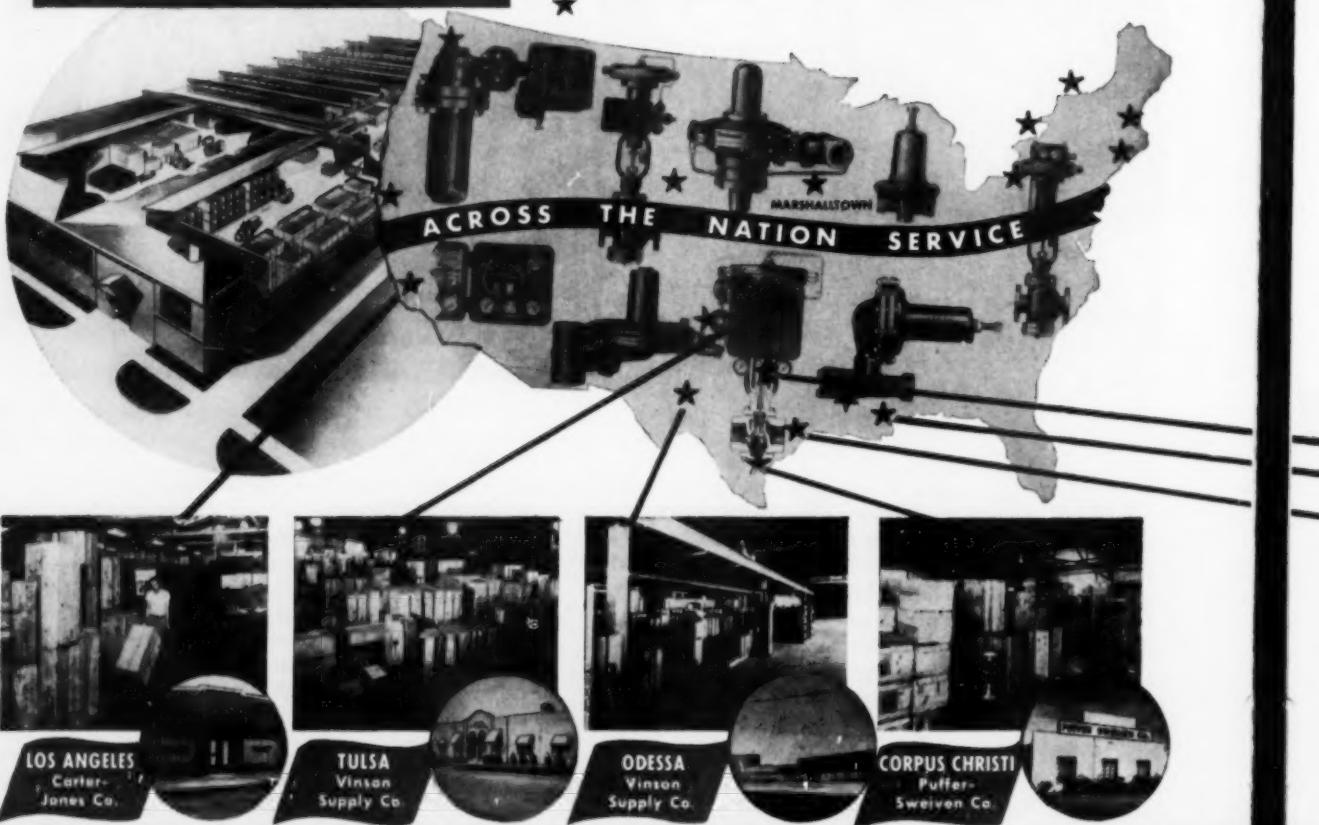
FACTORIES...AND FIELD STOCKS



MARSHALLTOWN, IOWA

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* Below—Factory No. 2. Over 50,000 sq. ft. of floor space. A major unit in Fisher's continuing expansion program of increased facilities and production.



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When you want it!

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Whether your problem is one of existing equipment—or an entirely new control application—the Fisher country-wide network of 19 strategically located field stocks and 51 representatives—with over 200 Fisher Service Engineers—offers you immediate and convenient service on all your control requirements.

A few typical Fisher Warehouse Stocks of new equipment and replacement parts are shown below.

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WORLD LEADER IN RESEARCH FOR BETTER PRESSURE AND LIQUID LEVEL CONTROL



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Puffer-Sweiven Co.



NEW ORLEANS
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DALLAS
Vinson Supply Co.

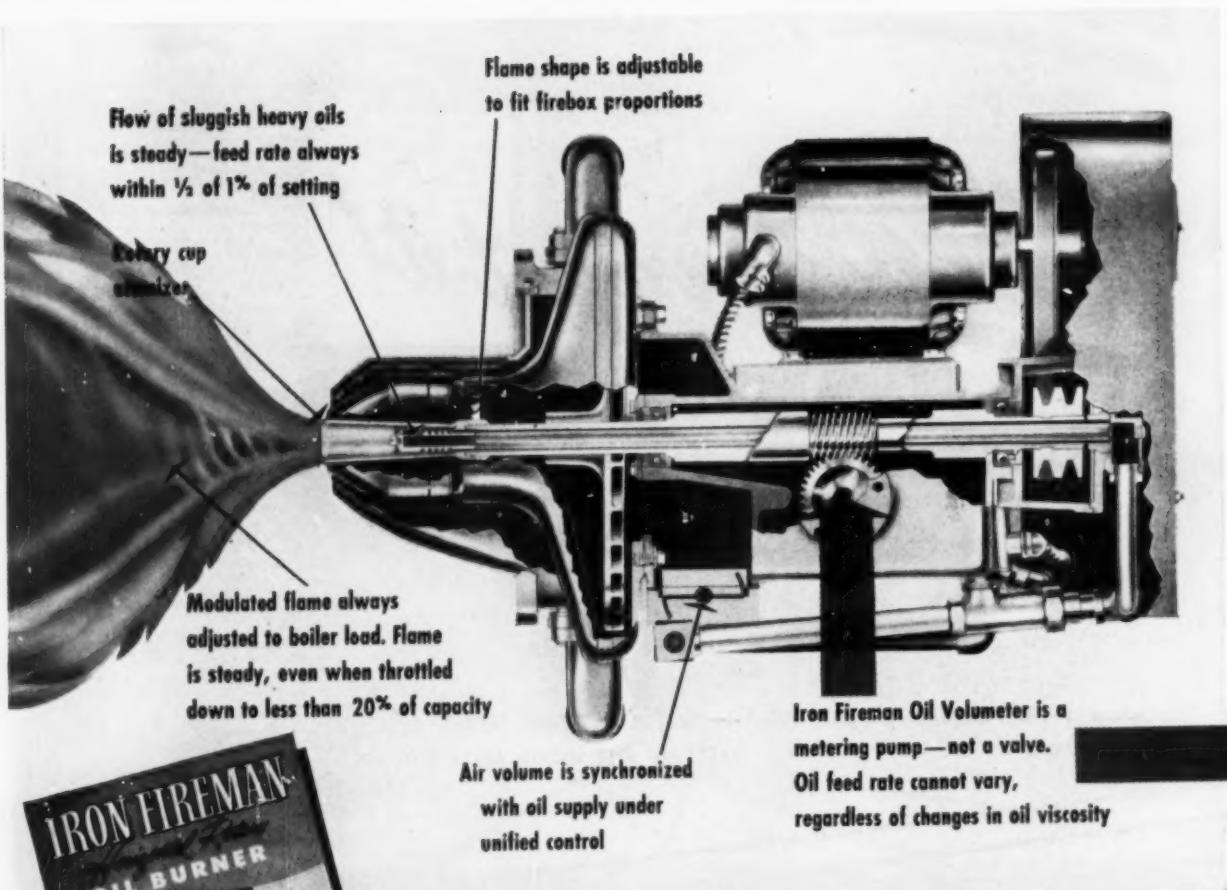
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OIL, GAS, COAL FIRING



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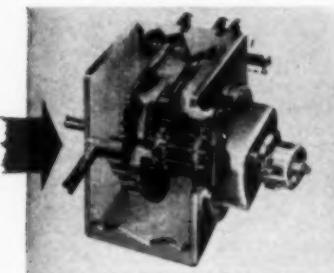
**Iron Fireman Horizontal Rotary Oil Burner
handles the heaviest industrial fuel oils with
accuracy and precision**

The troublesome, temperature-sensitive heavy oils (Nos. 5 and 6) are completely reliable fuels when fired with this Iron Fireman industrial oil burner. Its characteristics include dependable cold starting; a steady, even flame through an exceptionally wide firing range; and high combustion efficiency that stretches fuel dollars.

No viscosity adjustment is required. Outstanding proof is the fact that Iron

Fireman burners have long been operating in an asphalt plant, fueled by the by-products of the refining processes. These refuse oils vary from the heaviest oils to liquids as light as kerosene. Iron Fireman takes them as they come, without adjustment or other attention.

Synchronized fuel and air control, operated either manually or automatically, keeps air-fuel ratio correctly adjusted, regardless of firing rate.



Iron Fireman Oil Volumeter is secret of oil control

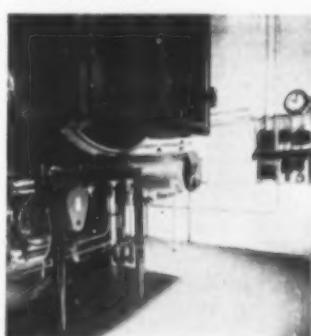
Oil is metered to the burner head under *low pressure* by a variable volume pump. Submerged in the oil reservoir, a multi-piston cylinder block revolves, pulling oil into each cylinder in turn, and a half revolution later ejecting it into the feed line. The fuel-feed rate is determined by the length of the piston stroke, and is *not affected by any other factor*. No valves, no viscosity compensating devices—just a steady, accurately metered oil supply.



Mr. J. Mayberry, Vice President
Quality Mills Mount Airy, N. C.
Manufacturers of
Quality Knit underwear

"We save \$3800 a year with our Iron Fireman Rotary Oil Burner"

"We have just checked the operating cost figures on our Iron Fireman Rotary oil burner," writes Mr. Mayberry, "and have found that we have a saving of \$1,800 in fuel cost over our previous firing method. In addition to this we are saving the cost of a fireman on our first shift which amounts to approximately \$2,000 per year. The efficiency of this unit has enabled us to save a great deal of time on many of our operations calling for quick steam. Needless to say, we are very well pleased with this installation. If you would like to have anyone inspect our boiler room at any time, please feel free to do so."



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trates with plant photographs, actual installations, and results.—SIEB-BATH GEAR AND PUMP CO.

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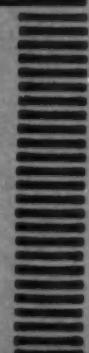
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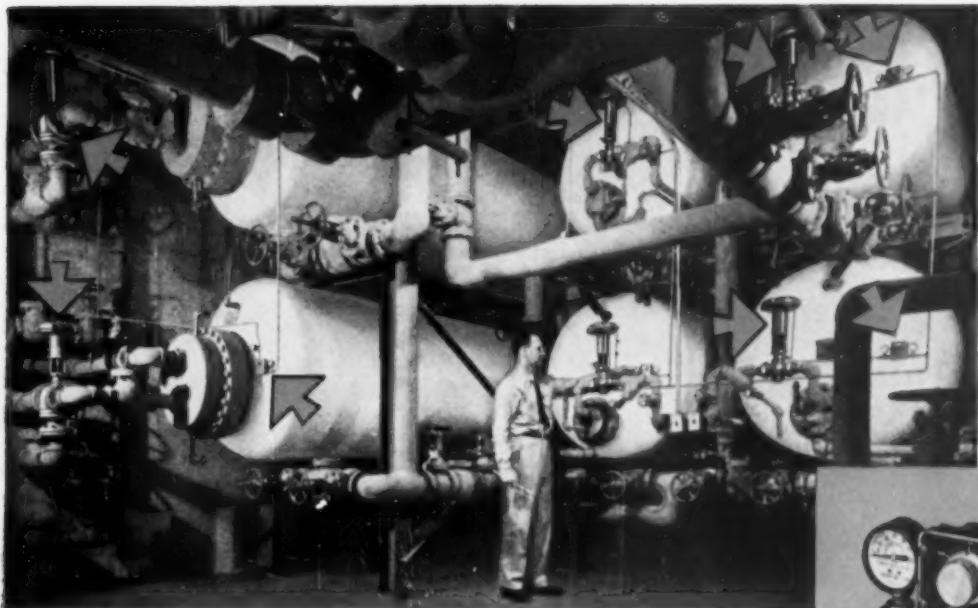
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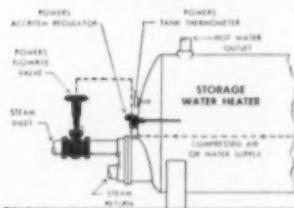


One of
Lever Brothers Co.
Famous Soaps



**Powers ACCRITEM Regulator
Compressed Air or Water Operated**

Unsurpassed for reliability and power to operate large or small diaphragm valves controlling Water Heaters, Heat Exchangers, Jacket Water Cooling for Diesel Engines or Air Compressors and many Industrial Processes.



POWERS WATER TEMPERATURE CONTROL

ACCRITEM Regulators were selected for LEVER BROTHERS beautiful modern building on Park Avenue in New York City. The air conditioning system here is also Powers controlled.

Water heaters in more and more prominent buildings are being equipped with Powers Accritem Regulators because of their —



Important Accritem Features that Give Better Control with Less Maintenance

- Adjustable Sensitivity and over-heat protection.
- Calibrated Dial temperature adjustment.
- Simple, Rugged Construction withstands vibration and insures years of reliable service.
- Temperature Ranges 50-250° F. and 150-350° F.
- Easy to Install. Requires 15 lb. supply of compressed air or water for its operation.
- Small Size—regulator head is only 2 7/8" x 3 5/8", sensitive bulb is 12" long with 1 1/2" I. P. S. connection.

Bulletin 316 gives full details

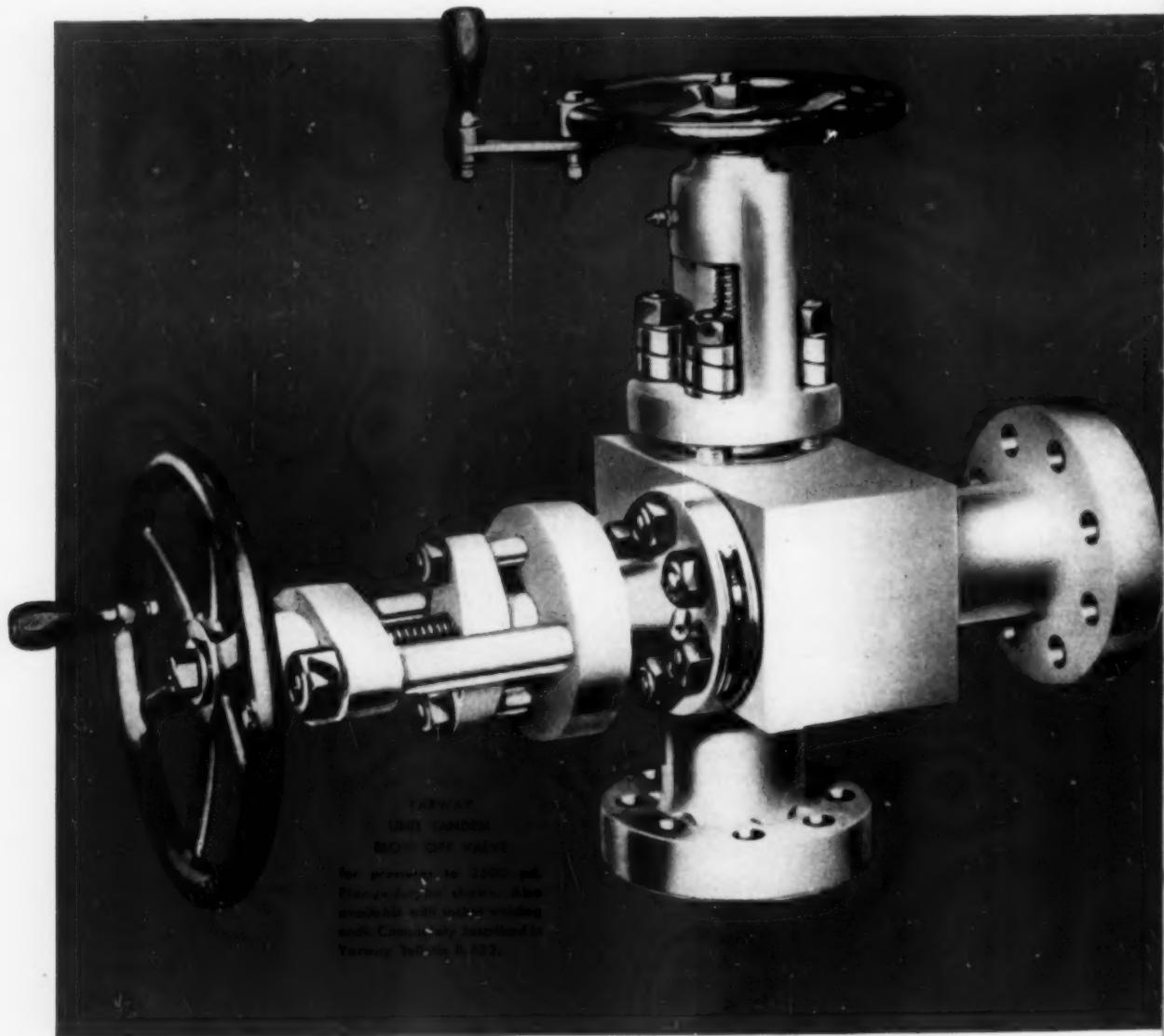
Call Powers for aid with your problems of temperature control. Our more than 60 years of experience may be helpful to you. Whether you want a simple self-operated regulator or thermostatic water mixing valve or a pneumatic control system with recording controllers... contact Powers.



THE POWERS REGULATOR COMPANY

Skokie, Ill. • Offices in Over 50 Cities, See your phone book • Established 1891

YOUR BOILER



YARWAY

IS WORTH A GOOD BLOW-OFF VALVE

Boilers represent sizable investments . . . certainly worth protecting with the most dependable boiler trim you can get.

You need good blow-off valves—valves that keep blow-down lines tight, don't wear, clog or leak, and are rugged enough to stand up under the severe shock of regular or emergency blowing-down under pressure.

Yarway Blow-Off Valves meet those requirements. Both Yarway Seatless Valves with balanced sliding plunger, and Yarway Stellite-faced Hard-Seat Valves embody the most recent developments in design and metallurgy.

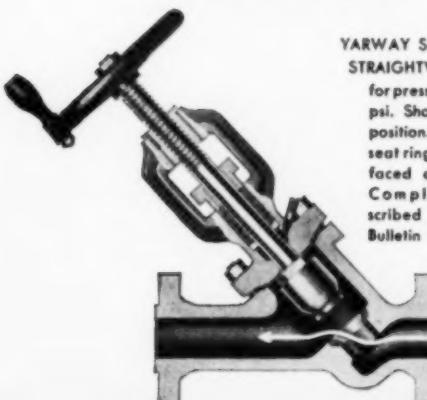
Engineers tell us the sturdiest of all blow-off valves is the Yarway Unit Tandem. This famous valve combines either a seatless and hard-seat, or two hard-seat valves, in a one-piece forged steel body. It is made for pressures up to 2500 psi. Other Yarway Blow-Off Valves meet lower pressure requirements.

It is significant that more than 15,000 plants throughout the world use Yarway Blow-Off Valves . . . and among the higher pressure plants, 4 out of every 5 are Yarway-equipped!

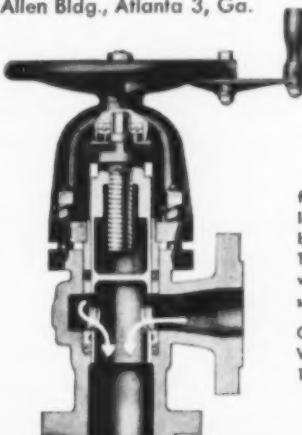
A Yarway bulletin will tell you in detail how these valves can protect *your* boiler investment. Write today, stating pressure range.

YARNALL-WARING COMPANY, Home Office: 116 Mermaid Ave., Phila. 18, Pa.

Southern Rep.: ROGER A. MARTIN, Bona Allen Bldg., Atlanta 3, Ga.



**YARWAY STELLITE-SEAT
STRAIGHTWAY VALVE**
for pressures to 2500
psi. Shown in open
position. Disc and
seat ring are stellite-
faced and ground.
Completely de-
scribed in Yarway
Bulletin B-432.



**YARWAY
TYPE "B" SEATLESS
ANGLE VALVE**
for pressures to 400 psi.
In open position. Notice
balanced sliding plunger.
There is no seat to score,
wear, clog or leak. De-
scribed in Bulletin B-424.

Other Yarway Seatless
Valves for pressures to
1500 psi.

STEAM PLANT EQUIPMENT



LIQUID LEVEL RECORDER



LIQUID LEVEL INDICATOR



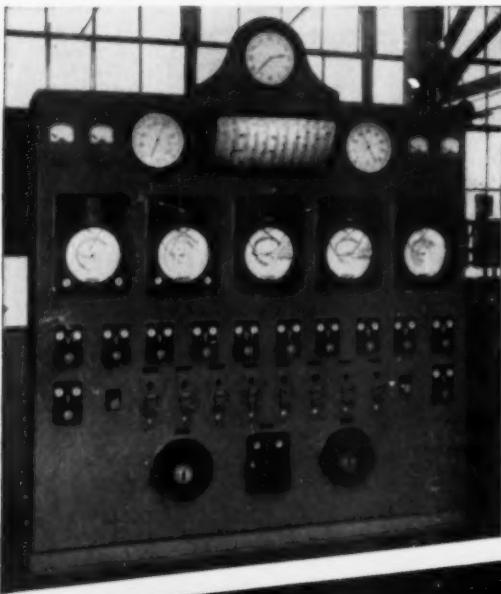
STEAM TRAP



EXPANSION JOINTS



WATER COLUMNS AND GAUGES



This Bailey Boiler Control Panel in a mid-western industrial plant saves fuel and insures safe operation of a 100,000 lb per hr, 175 psi, sat., pulverized coal and gas-fired boiler.

What's Your Control-Dollar Efficiency?

Control-dollars frequently bring annual investment returns of 100% or more. When you buy adequate, well-applied steam plant controls, you increase your dollars' ability to work usefully for you.

That's where Bailey can help: Bailey Controls can give you a better control-dollar efficiency. Here's why:

1. Complete Range of Equipment—fully co-ordinated.

You need never worry that a Bailey Engineer's recommendation is slanted in favor of a particular type of equipment, just because he has a limited line to sell—or that Bailey will pass the buck for efficient control; we offer *complete* boiler control systems.

2. Engineering Service—backed by experience.

No other manufacturer of instruments and controls can offer as broad an experience, based on successful installations involving all types of combustion, flow measurement and automatic control.

3. Direct Sales-Service—conveniently located near you.

Bailey Meter Company's sales-service engineers are located in more

industrial centers than those of any other manufacturer of boiler control systems; you get prompt, experienced service with a minimum of travel time and expense.

For better control-dollar efficiency—for more power per fuel dollar, less outage and safer working conditions, you owe it to yourself to investigate Bailey Controls. Ask a Bailey Engineer to arrange a visit to a nearby Bailey installation. We're proud to stand on our record: "More power to you!"

A-112-1



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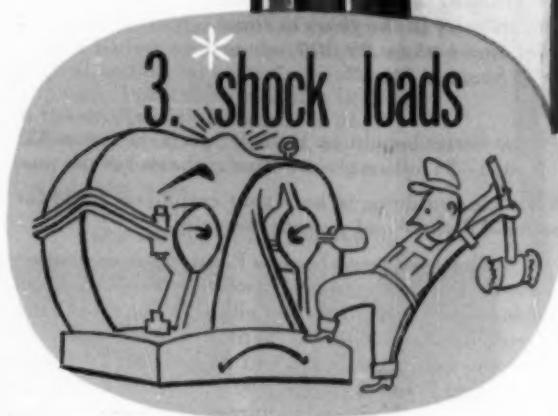
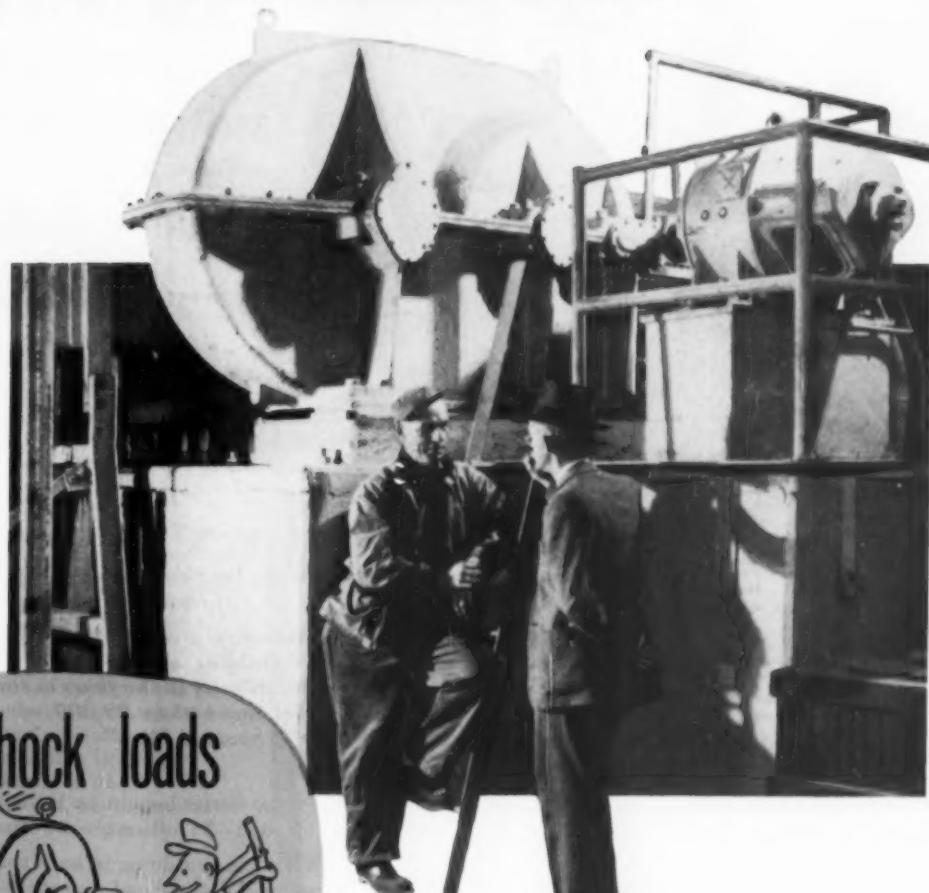
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CLEVELAND 10, OHIO

Controls for Steam Plants

COMBUSTION - FEED WATER
TEMPERATURE - PRESSURE
LIQUID LEVEL - FEED PUMPS

*Better gear protection
when you need it!**

-GULF E. P. LUBRICANTS



3.* shock loads

With Gulf E.P. Lubricants you get extra protection against gear troubles when production demands put shock loads on equipment. They are specially compounded to prevent metal-to-metal contact and help protect against pitting, spalling, and excessive wear.

For specific recommendations for your equipment, call in a Gulf Sales Engineer today. Write, wire, or phone your nearest Gulf office.



**Gulf Oil Corporation • Gulf Refining Company
Pittsburgh 30, Pa.**



***“Every dollar
--double duty...”***

HARVEY S. FIRESTONE, JR.

Chairman, The Firestone Tire and Rubber Company

“Every dollar invested in U.S. Defense Bonds does double duty. Through the Payroll Savings Plan we help in the building of national defense and, at the same time, provide for personal security in the years to come. The Firestone organization is proud that more than 29,000 of our employees are participating in the Payroll Savings Plan.”

Do America's wage earners appreciate that double duty feature of Defense Bonds? Let's take a quick look at a few figures:

- 7,500,000 employed men and women are investing one hundred and fifty million dollars per month in Defense Bonds through the Payroll Savings Plan.
- The number of Payroll Savers is going up steadily.
- In the first six months of this year, sales of Series E \$25 and \$50 Bonds—the payroll savers' sizes—totaled 33,946,000 pieces—an increase of 22% over the corresponding period of 1951.
- Sales of E Bonds in January-June, 1952 totaled \$1,715 million—5% more than in the same period of 1951. (The Payroll Savings Plan is the backbone of E Bond sales.)
- Today Americans hold a cash value of more than \$49 billion in Savings Bonds. Their holdings of E Bonds

—the Series bought by Payroll Savers—are now \$35 billion—\$5 billion greater than at the end of the war.

What are you doing to help your employees build for national defense and personal security?

If you have a Payroll Savings Plan, and participation is less than 50%, conduct a person-to-person canvass of employees of your plants and offices. Make sure that a Payroll Application Blank is placed in the hands of every employee. He or she will do the rest. Participation in your Plan will jump to 60%, 70%—even higher, as it has in hundreds and hundreds of plants that have conducted similar canvasses.

If you do not have the Payroll Savings Plan, phone, wire or write to Savings Bond Division, U.S. Treasury Department, Suite 700, Washington Building, Washington, D. C. Your State Director will help you to install the Plan—or to conduct a person-to-person canvass.

The U. S. Government does not pay for this advertising. The Treasury Department thanks, for their patriotic donation, the Advertising Council and

SOUTHERN POWER & INDUSTRY



dependable Heat that is
economical-efficient-
easy to use

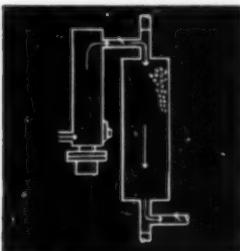
CHROMALOX ELECTRIC Circulation Heaters

for heating liquids
preheating fuel oils
heating compressed air
and other gases

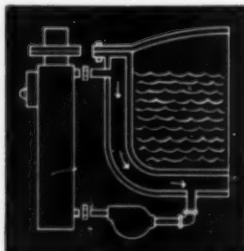
Production costs go down . . . operating efficiency goes up when you install economical CHROMALOX Circulation Heaters. They give you measured quantities of heat, at temperatures up to 750° F. that can be rapidly reached and accurately controlled. Dependable, around-the-clock operation, minimum maintenance.

Uses include: Water heating applications such as steam boilers and accumulators; jacketed chemical kettles, tanks and processing equipment. Preheating fuel oils; heating Dowtherm, Aroclor, Prestone or heat transfer oils. Heating nitrogen, air and other gases, drying steam, plastic powders and other process work.

HERE ARE TWO TYPICAL APPLICATIONS



Heating Nitrogen to Reactivate Alumina



Heating Oil-Jacketed Kettle

CHROMALOX

Electric Heat for Modern Industry

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CHROMALOX
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3. Accurate temperature control — thermostatically or manually regulated.
4. Wide selection to meet your specific heat requirements.
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for more information
Write for Catalog 50

It has complete data on many of the 15,000 Chromalox Electric Heaters and Equipment used in modern industry.

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Pittsburgh 8, Pa.
Please send Catalog 50

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**Top Turbine Performance
at Brazos River Plant
Assured by CONSECO
Condenser and Heater Unit**

**Heater Handles 123,000-lb.
Feedwater Per Hour**

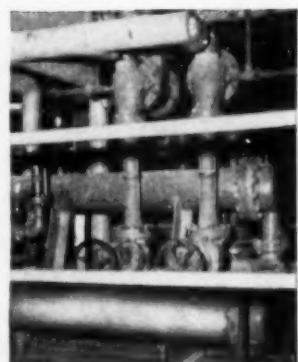
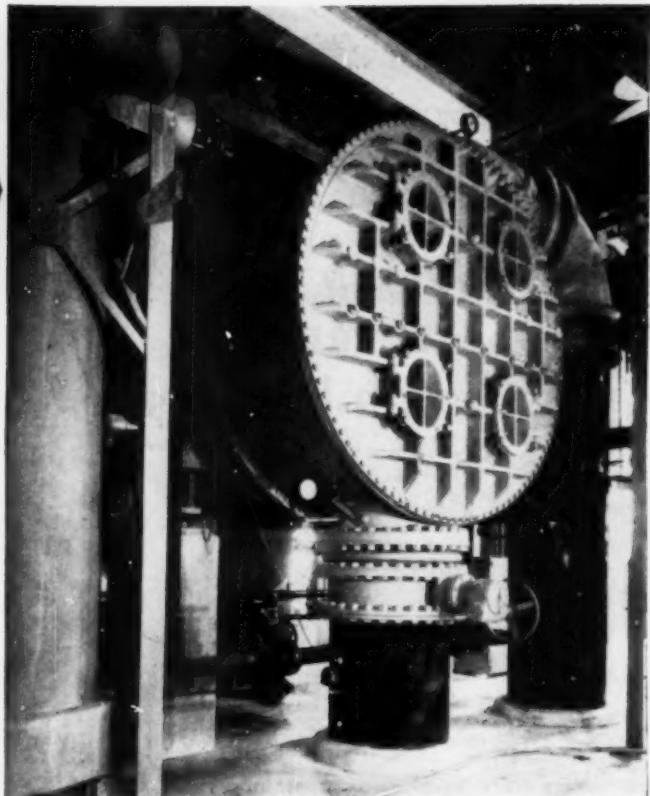
Another example of the way Conesco Equipment helps step up central station performance is found at Brazos River, Texas, plant of Brazos River Power Transmission Electric Co-op.

Here a 14,000 sq. ft. 2 pass, non-divided flow Conesco Condenser, with horizontal type hot well and spring supports, handles a 11,500 kw. turbine.

As pictured in above photograph, a Conesco Feedwater Heater at left of condenser is a high pressure vertical unit handling 123,000 lb. of feedwater per hr., from 293 deg. to 362 deg. F at 800 psig extraction steam. Heater is fitted with cast-steel heads and is of the pull-through type.

Besides the high-pressure unit shown, this Conesco Feed Heating installation includes a low-pressure horizontal unit and an intermediate pressure vertical unit. Shown below at right, is the Conesco Air Injector installed at Brazos River. It is of the twin-element, two-stage type, with separate inter and after condensers.

CONSULT CONSECO ENGINEERS about your condenser and feedwater heater needs. They will be glad to tell about the advanced features which assure trouble-free, low cost performance in your plant



Conesco Twin Element, Two-Stage Air Injector installed at Brazos River Plant, Texas

CONSECO LINE includes:

BOILERS • CONDENSERS • STEAM AIR JET EJECTORS • DEAERATORS • CLOSED HEATERS



This collector makes a difference

in

pneumatic system COSTS

A-S-H engineers have perfected a Continuous Vacuum Collector that gives new economy in ash and dust disposal. Because dumping and collecting are done simultaneously, operating time is reduced one-third and carry-over is next to nothing. While equivalent in handling capacity to a double cyclone, the Continuous Vacuum Collector features an exceptional simplicity of design.

This is just one of the many improvements that A-S-H engineering offers you in pneumatic materials handling. Write today for our latest catalogs and get the whole story.



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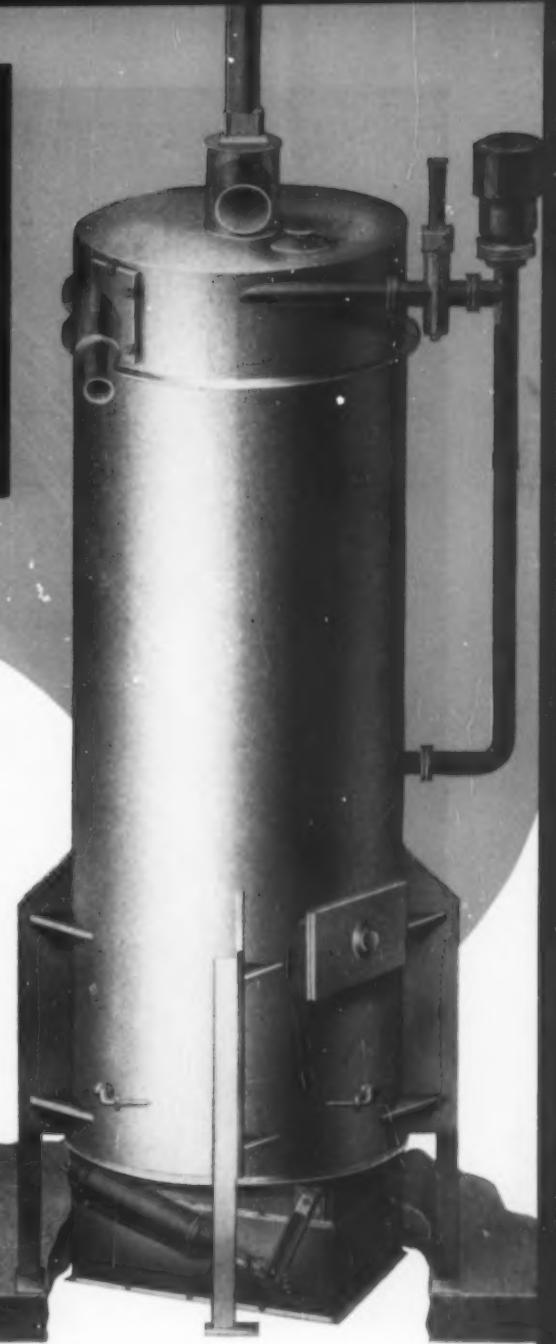
HYDROJET

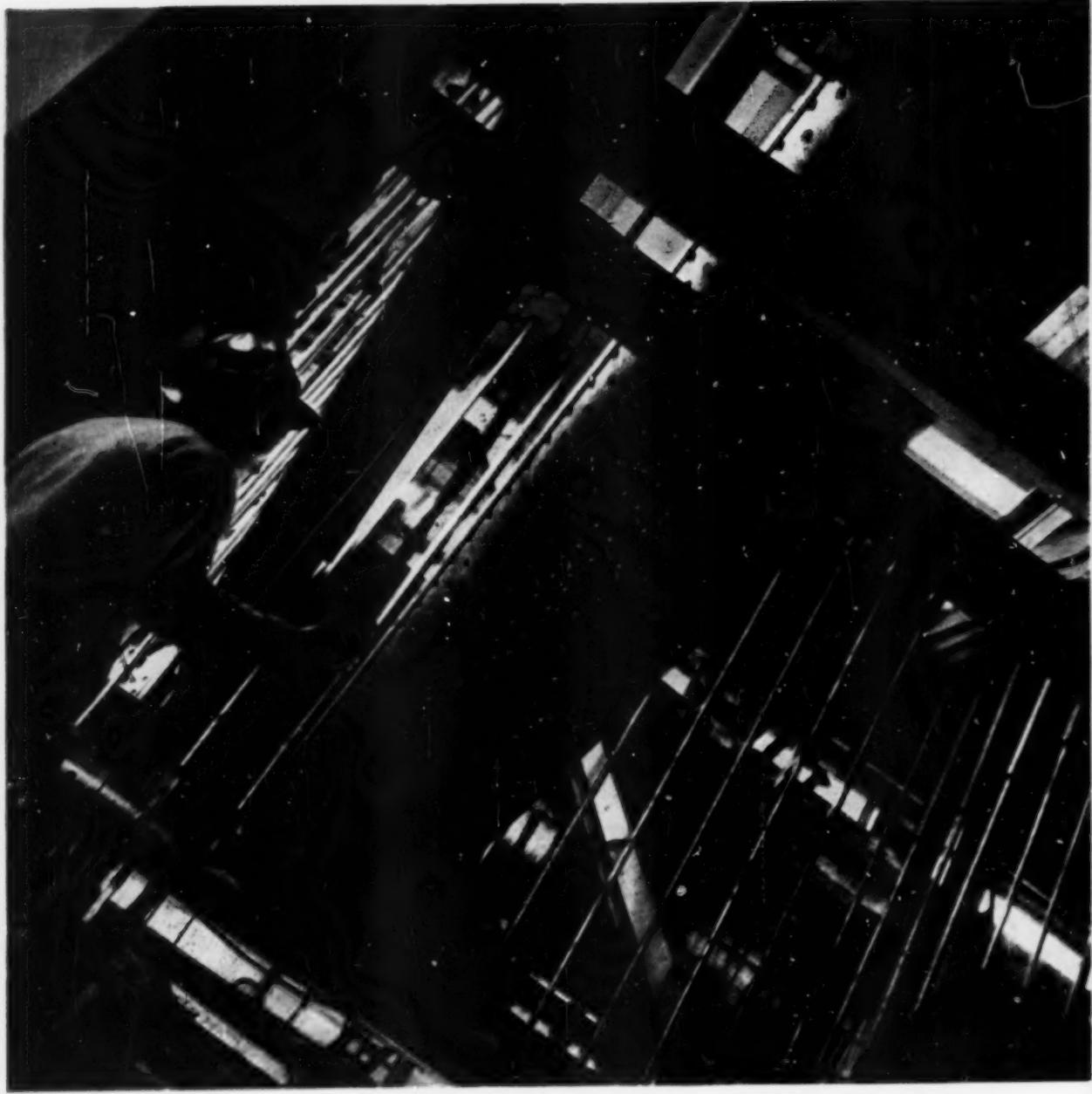
(hydraulic)

materials handling systems

HYDROVAC

(pneumatic)



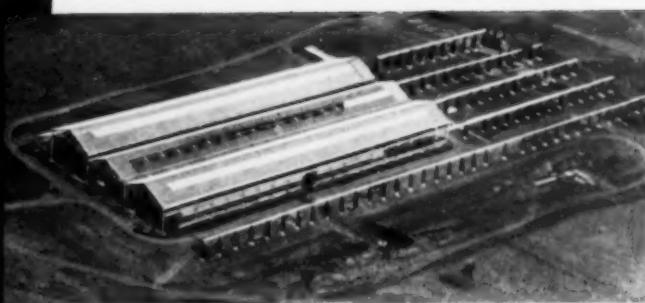


SPEEDING STEAM POWER

**BABCOCK
& WILCOX**



G-5827



Paris, Texas



Wilmington, North Carolina



West Point, Mississippi



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ON FOUR NEW FRONTS

America's industrial growth is measured in kilowatts, units of electrical energy which make up the brawn and sinew of U. S. production. More and more of these energy units are being consumed in this land which is, characteristically, always building, always pioneering. In fact, so many lusty, bawling industrial infants—children of America's men of vision—are growing up so fast that Babcock & Wilcox is pouring millions of dollars into new plants and equipment to provide more steam power for public utilities and for

all industry. New plants at Wilmington, N. C., West Point, Miss., Brunswick, Ga., and Paris, Texas, recently have been added to B&W's network of facilities for manufacturing the equipment to harness energy through the driving force of steam. In all, ten great B&W plants, spotted around the map like sentinels helping to guard the nation's strength, are efficiently geared to continue to contribute to America's boundless potential.



Thousands of Anaconda Potheads—like the one in center of this specially posed photograph—are available from relatively few, readily-interchangeable components. A wider variety than ever before—yet stockroom parts inventory is actually less. To fill *all* your pothead specifications, you need fewer parts.



A neater and better job can be obtained by using an Anaconda Jointing Kit. These unit packages of jointing materials contain all necessary materials to make one complete joint on a specific size and type of cable. An Anaconda Jointing Kit eliminates the possibility of inadequate materials . . . cuts down the need for large stocks.



Greater stability of Anaconda Insulating Compounds is based on extensive research for balanced compositions with proper physical and electrical characteristics for any installation.

ANACONDA CABLE ACCESSORIES

Service is better than ever on this complete line, designed by power-cable specialists for use with any make of cable. Expanded facilities keep pace with trend toward ordering cable and cable accessories together.

Anaconda's 20-year-old Cable Accessories Department is busier now than ever. In new and expanded quarters it is turning out greatly increased quantities of potheads, jointing kits, insulating compounds and paints. Back of this activity lies a story of increased demand by utilities, railroads, industrials, and equipment manufacturers for cable accessories that are engineered by power-cable specialists. Here, old and new customers have found the consistent quality, good engineering, ease of installation and low cost of maintenance traditional with Anaconda for years.

ANACONDA Potheads spearhead the line. Available in such types as capnut, switchgear, transformer, disconnect, and through types, they feature an interchangeability of parts equalled nowhere else.

More than 2000 different pothead assemblies can be furnished from standard parts for any particular conductor size and voltage rating in the multi-conductor capnut type alone!

Another popular item is the ANACONDA Unit Package of Jointing Material. In one package (see illustration) is everything needed to make a complete joint on a specific size and type of cable. The kit saves time, simplifies ordering, minimizes the need for storeroom stocks, and helps assure installation of a joint engineered for the particular application.

To keep pace with the increasing demand for ANACONDA Accessories, it has been necessary again to greatly

increase the facilities of the Cable Accessories Department. This Department is now in a position to promise prompt shipment on most of your orders. Call your Anaconda Representative. He is always ready to help you with your cable and accessories problems.

Accessories for all types and sizes of bare and insulated conductors.

ANACONDA®

Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.

Gentlemen:
I'm interested in Anaconda Cable Accessories.

- Have your representative call.
- Send me your 100-page Pothead and Terminal Catalog.
- Send me your Jointing Material Catalog.
- Send me complete Cable Accessories Catalog.

NAME.....

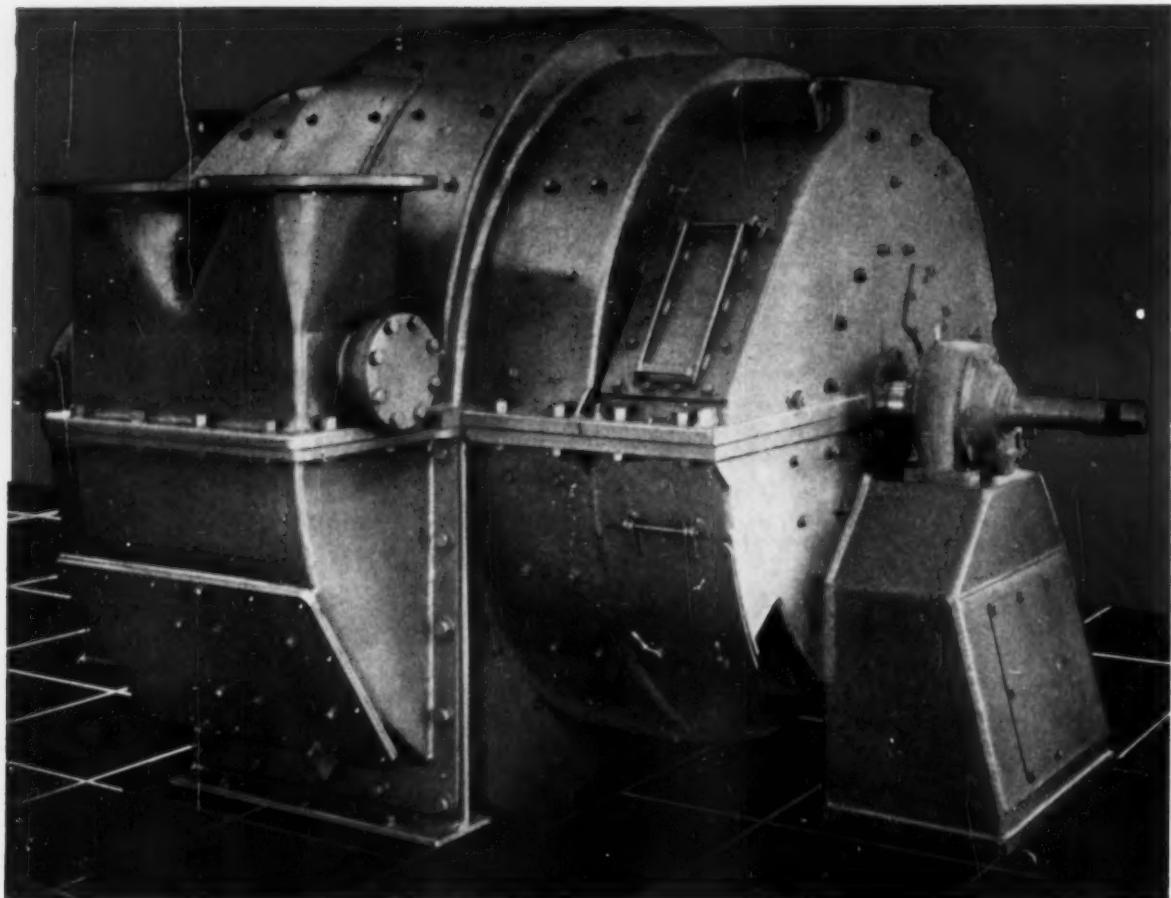
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Performance of Riley "50" Pulverizers



Riley "50" Pulverizers give you all these other significant advantages . . .

Quiet vibrationless operation
Flexibility—wide load range
Ability to carry extremely low loads
Low power consumption
Ease of regulation

Small space required
Minimum foundation cost
Parts easily renewed
Can be operated without coal feed
Ease of ignition

Low lubrication cost
No worms or gears—Just two bearings
High primary air temperatures
Low maintenance

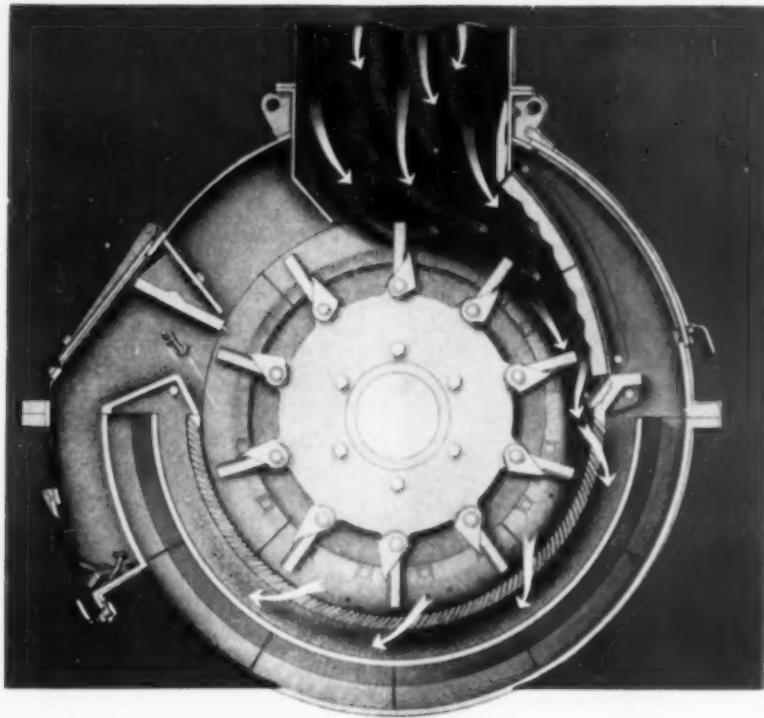
The Riley "50" Pulverizer is the latest development in the coal pulverizing field. It is the only pulverizer using tungsten carbide parts to assure long periods of continuous operation and low maintenance. It will pay you to investigate Riley "50" Pulverizers when considering this type of equipment.



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BOILERS • PULVERIZERS • BURNERS • STOKERS • SUPERHEATERS • ECONOMIZERS

not affected by Increase in Moisture



All of these people have ordered
Riley "50" Pulverizers within the
past two years.

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This Crusher-Dryer Stage Does the Trick

Both field and laboratory tests have conclusively proven that moisture content of coal does not affect performance of Riley "50" Pulverizers and that capacity is not decreased with an increase in moisture provided primary air temperatures are adequate. Coals with free moisture up to 15%, which is about the free moisture limit that coal can retain, have been satisfactorily pulverized.

The ability of Riley "50" Pulverizers to handle such high moisture coals without capacity reduction is due to the performance of the crusher-dryer section of the Riley "50" Pulverizer. In this first stage, the free moisture is evaporated and the coal crushed to a fine granular state so that coal passing to final pulverizing stage is free of surface moisture.

Ask users of Riley "50" Pulverizers—they will tell you that moisture of coal means nothing to their Riley "50" Pulverizers.

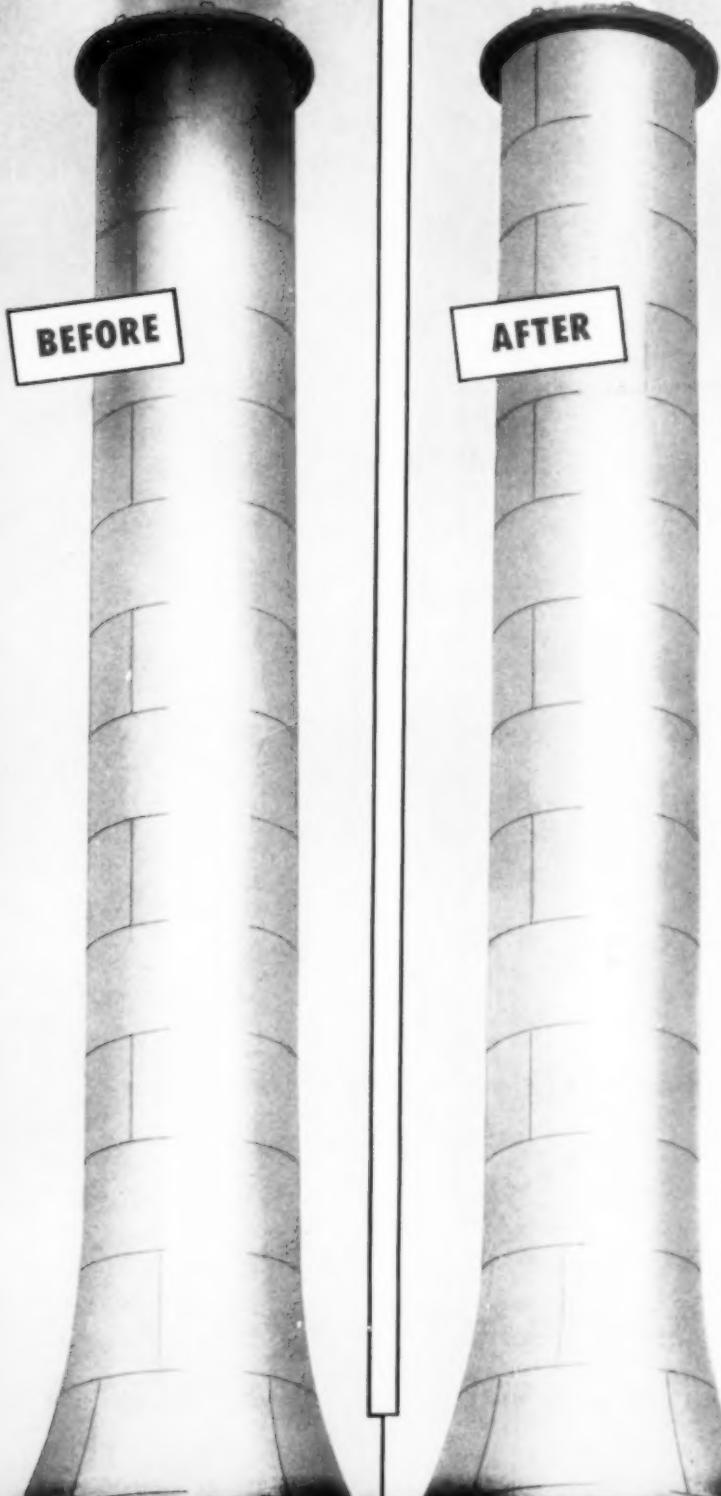
A survey of your Power Plant by a consulting engineer will possibly show ways of making surprisingly large savings in your power costs

COMPLETE STEAM GENERATING UNITS

WATER-COOLED FURNACES • STEEL-CLAD INSULATED SETTINGS • AIR HEATERS

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modern Riley installations
before purchasing Boiler or
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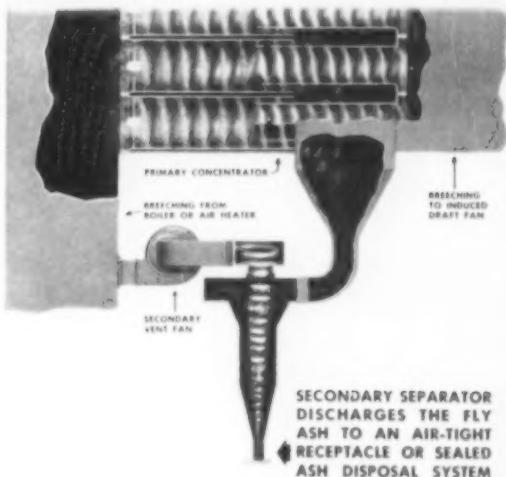
American Blower . . . a time-honored name in air handling



Installation of an American Blower Type ST Fly Ash Precipitator can make the difference shown here.

On a given application, as the load falls off and fly ash becomes harder to catch, the ST Precipitator automatically maintains a higher efficiency than any other collector of mechanical type.

Contact the American Blower or Canadian Sirocco Branch Office nearest you. They are conveniently located throughout the United States and Canada to provide complete information concerning the benefits of installing fly ash precipitators in your plant to meet your specific needs. Call on one today.



AMERICAN  **BLOWER**

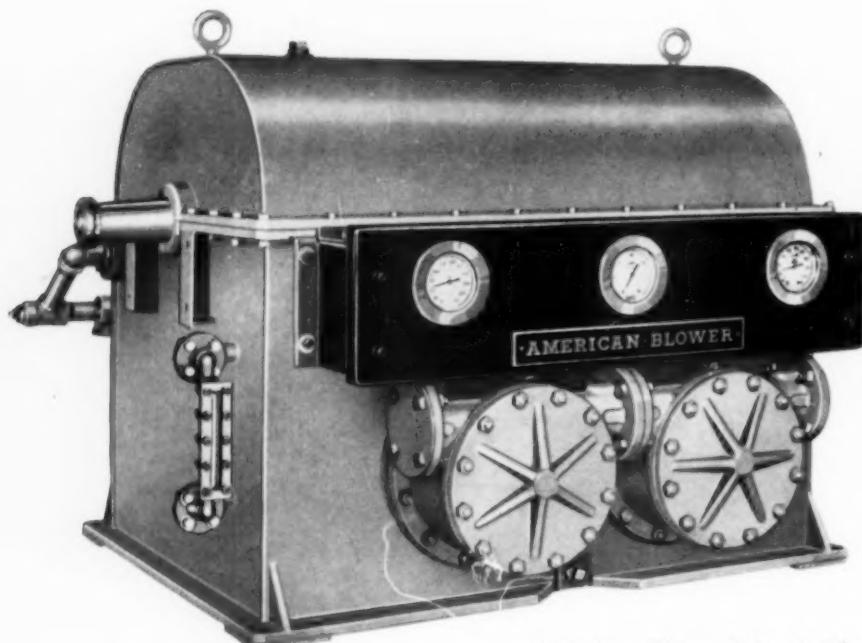
AMERICAN BLOWER CORPORATION, DETROIT 32, MICHIGAN
CANADIAN SIROCCO COMPANY, LTD., WINDSOR, ONTARIO

Division of AMERICAN RADIATOR & Standard Sanitary CORPORATION

Serving home and industry

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American Blower . . . a time-honored name in power plant equipment



American Blower Class 6 Gyrol Fluid Drive

Memo to Power Plant Men —

You can enjoy important power savings, flexible stepless control, reduced maintenance, and get lower pressures at reduced flows for your boiler-feed-pump operation. Install an American Blower Adjustable Speed Gyrol Fluid Drive with a constant speed driving motor.

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72 ALUMINUM PRECIPITATORS



built by Chicago Bridge & Iron Company

Erected at Bauxite, Arkansas, for Aluminum Ore Company, these precipitators are located in the heart of the U. S. aluminum ore producing country. In Arkansas, where the mining of bauxite is a major industry, modern up-to-date handling and processing equipment is of prime importance.

Chicago Bridge & Iron is equipped to build welded steel structures such as these precipitators, for industries of all types anywhere in the world. Specialized construction and exacting specifications offer no obstacles to our design, fabrication and erection departments. We have facilities for stress-relieving and x-raying and also for pickling and painting by the Horton Phosphoric Acid process at three of our plants.

The installation shown here is an example of the special structures we build. We also fabricate and erect standard processing such as oil storage tanks, elevated water tanks and processing towers and columns. Write our nearest office for information and quotations. There is no obligation on your part.



Top view: Some of the seventy-two 24-ft. diam. precipitators during erection for Aluminum Ore Company, Bauxite, Arkansas. Above: Some of the precipitators after completion.

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Chicago 4.....	2107 McCormick Bldg.	Los Angeles 17.....	1545 General Petroleum Bldg.	Tulsa 3.....	1628 Hunt Bldg.
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Machine Operator

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Male Help Wanted
Second Shift

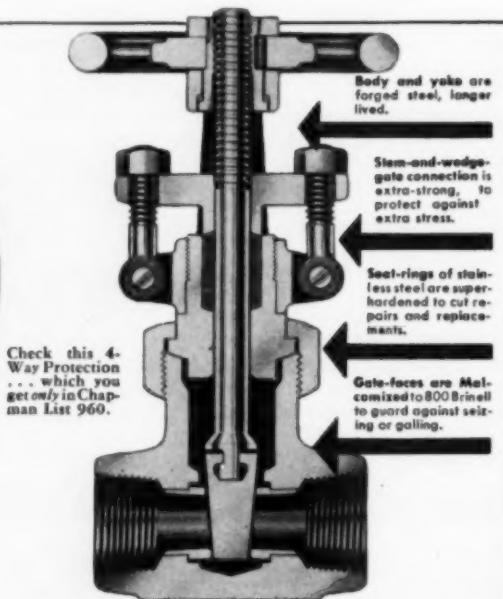
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Indian Orchard, Mass.

Timely Comments



The Economic Facts of Life

IN THIS ISSUE, Senator Harry F. Byrd, the nation's long-time leading exponent of governmental economy, points to the desperate need of cutting federal spending and balancing the budget. Read "Freedom Demands a Solvent America"—second in a series on problems of business and government written exclusively for Southern Power & Industry and other W. R. C. Smith Publications.

It is our responsibility—yours and ours alike—to help spread a better understanding of fundamental economic facts among our associates (for instance, the fact that a higher standard of living can result only from increased production, not from increased money supply).

That is why we are publishing this extensive series of articles on the economic "facts of life" by Americans of national prominence. Reprints up to five will be furnished without charge. Larger quantities will be supplied at cost.

Write it in Pencil Rather

Than in Ink

TO A GREATER DEGREE than ever before, business success depends on long-term planning, so long as the plans are "written in pencil rather than in ink," emphasized Mark W. Cresap, Jr., vice-president of Westinghouse Electric Corporation, before the Annual Fall Conference of the Society for Advancement of Management.

The difficulty of predicting the future must not be used as an excuse to ignore business planning. The key to successful planning lies in "flexibility of the same type that military plans must possess—so that incorrect assumptions and unpredicted developments do not destroy the eventual execution of a planned operation."

Figuratively, long-term plans should be written in pencil rather than in ink. Specifically, plans should be regularly revised every year, with each revision embracing the five subsequent years, and reflecting new circumstances and conditions, thus providing a rolling five-year plan based on up-to-date information and estimates.

Mr. Cresap, assistant to Westinghouse president Gwilym A. Price, noted that "It is true that

we live in uncertain times—the most uncertain that any generation of businessmen have ever experienced—but to ignore planning for this reason is, in effect, to decide to quit the race. Not to plan is not to look ahead, and not to look ahead is retirement.

Program for the South's Progress

A PROGRAM, designed to carry the South to unprecedented achievements in business, technology, and agriculture has been announced by James F. Crist, President of the Southern Association of Science and Industry. Here are the South's major needs—or opportunities—as outlined to members of the region's foremost development body throughout the 14 Southern states.

Promotion—A continuation of intensive efforts to acquaint people everywhere with the progressive trend in the South and the opportunities that exist here.

Exploration—More extensive studies of the resources of the South, particularly minerals and water.

Transportation—Further improvement of means for transporting industrial products and raw materials, including port facilities, pipelines, air, rail and highway services.

Wastes—Greater utilization of industrial wastes and consequent minimizing of air and stream pollution.

Education—Constant efforts to improve the entire educational structure, particularly with regard to advanced scientific training.

Research—Wider use of existing research facilities and construction of new laboratories where needed.

Utilities—Further expansion of facilities for providing industries with electric power, natural gas, and other services.

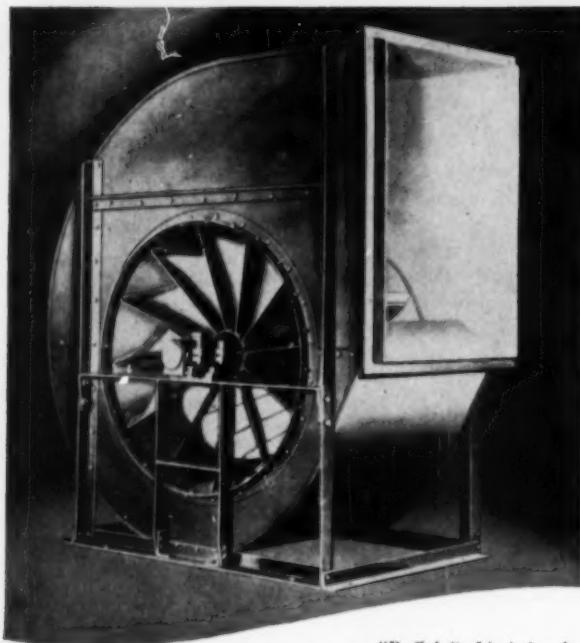
Atomic Energy—A strong effort to apply atomic energy in Southern industry, especially with regard to use of radioisotopes.

Marketing—Improvement in the advertising, selling, and distributing of the products manufactured in the region.

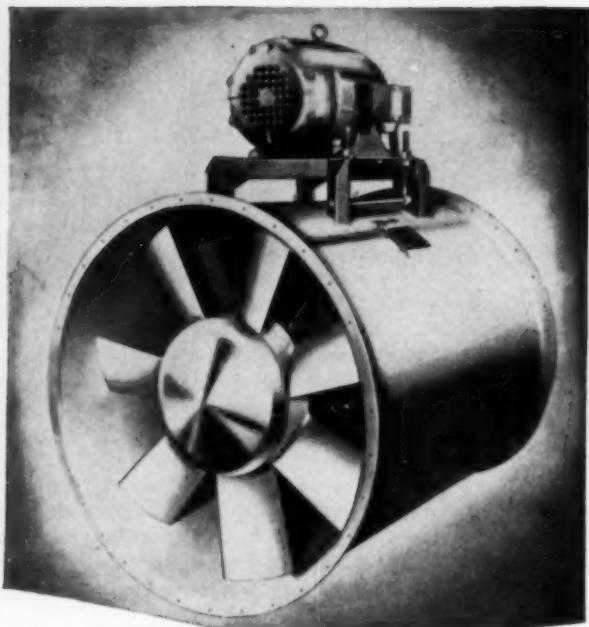
Coordination—A general effort to coordinate the efforts of the hundreds of groups working to promote Southern progress in order to eliminate duplication and focus attention on neglected fields.

Let's not overlook

QUALITY



"Buffalo" Limit-Load, the fan that supplies the air for many of the world's finest ventilating and air conditioning systems.



The quiet, efficient Type "B" Vaneaxial Fan is one reason why "Buffalo" has earned—and kept—the reputation "First for Fans."

Quality is a relative term—it can be poor, medium, high or the best. We think you should evaluate fans and air cleaning and conditioning equipment according to the "Q" Factor.*

Engineers are not easily misled when they turn an engineering eye on mechanical things. They know that efficiency is important and that rugged construction, ease of assembly and repair are also desirable. They value simplicity if it's not for economy of manufacture. Above all,

we believe, they admire reliable, long life performance.

Because in seventy-five years of manufacturing fans, air cleaning and conditioning equipment we have stuck to an original idea—"build it the best we know how," we welcome your critical inspection of Buffalo products. You'll find that both design and construction contribute to their record for long life on the job.

Engineering sales representatives in principal cities are anxious to work with you.

*—The "Q" Factor—The built-in Quality which provides trouble-free satisfaction and long life.



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Industry Speaks

SOUTHERN POWER
AND INDUSTRY

REAL ECONOMY . . . a state of mind

Adapted from comments by Benjamin F. Fairless, chairman of the board of United States Steel, before the fall meeting of the Georgia State Chamber of Commerce in Atlanta, Georgia.

FEDERAL TAXES TODAY, because of their size, incentive-killing design, and the deceptive way in which they are applied, stand as a triple threat to our future. This threat will never subside until the American people themselves rise up to force economies in government.

The growth of American business is being seriously stunted by the fiscal policies of our Federal Government—policies which have placed upon our industrial economy a burden which is becoming intolerable to business of every size, but which is falling with particularly dangerous effect upon our small, new enterprises.

What About Profit?

The main reason why people work is to gain a reward for their labor. If they work for other people, that reward is called a wage or salary. If they set up a business of their own and work for themselves their reward—when they get it—is called a profit. Without the hope of profit, no business would ever be established; without the realization of profit no business can continue to live; and without an adequate profit, no business is able to grow.

Since the end of World War II, more than half of all the profits which American industry has earned have been plowed back into the business to support its growth; for growth is as essential to enterprise as it is to humans—particularly in infancy. That is why the mortality rate among new businesses is so enormous. Most of these establishments die in the early years of their lives, because they have not been able to earn the profit they needed to grow on.

Profits are the food which supports the life and growth of our business population, just as wages provide the food which nourishes our human population. If too much of that economic food is taxed away, those populations will sicken and wither from malnutrition.

30 . . . 52 . . . and 82 per cent

The government levies a normal tax of 30 per cent on our very smallest businesses. On businesses with larger earnings it levies a surtax which brings

the rate up to 52 per cent. Under present law, it also imposes a so-called "excess profits tax" of 82 per cent on business growth.

If business grows, increases its efficiency, its production, and its service, the government says: "That's just too bad. It'll cost you a penalty of 82 per cent." If a business does not grow—if earnings are just what they averaged several years ago—it still must pay the government that 82 per cent penalty tax on one-sixth of its normal, peacetime profits.

The so-called excess profits tax is a destructive tax, dishonestly named. It is not—as its name implies—a tax upon excessive profits. It is an excessive tax upon normal profits, on business efficiency, on industrial growth, and on public service.

The old, established businesses which have gained a high degree of efficiency through years of experience have a better chance of survival under the crushing weight of these taxes than does a newly-founded business—for if the new business cannot add the tax to the price of its product and still meet the price levels of its competitors, it will soon have no profit left to grow on, and it is through.

So, the time has come when our government must face up to the fact that its so-called corporation tax is nothing more nor less than a hidden sales tax which is concealed in the price of everything we buy. For instance, \$625 of the price of a \$2,000 automobile is taxes, and the average buyer doesn't know that. Suppose the sales ticket on that car had read: "Price \$1,375; Tax, 45 per cent; Total \$2,000." Would the purchaser still favor a bigger, more expensive government?

If every business could bill its customers separately for the taxes which it is forced to collect from them, and if those taxes were shown clearly on every bill of sale, the purchaser would know exactly where to place the blame and would do so with an emphasis and vigor that the most callous of our government spenders could never ignore.

Real economy can never be achieved in Washington by the effort of Congress alone. It cannot be accomplished by hacking splinters off the edges of an executive budget that is wasteful to the core; for real economy is not merely a legislative act—it is a state of mind.

It is a state of mind which is firmly determined to stop—here and now—this endless bureaucratic desire to extend the power and authority of the Federal government ever further over the lives of our people.

Electrical Equipment Conference

STAFF REPORT

Carolina plant men consider electrical equipment and maintenance—troubles and remedies

ELECTRICAL ENGINEERS and maintenance men, from textile mills in the Piedmont-Carolinas met at North Carolina State College, November 6 and 7, for a Conference on Electrical Equipment. Approximately 165 men registered for the two day conference, which was sponsored by the National Sub-Committee on Textiles, of the American Institute of Electrical Engineers. Meetings of this nature have been held for the past several years at Georgia School of Technology, in Atlanta, but this was the first meeting held in the Carolina area. Plans have been made to make this conference an annual event.

The first session of the conference was devoted to papers on electric motors and their application. The second session included a paper on elevator control and maintenance and one on electrical problems and their remedies. These were followed by a discussion in which questions were asked from the floor and answers were given by a panel of seven electrical experts. The session was concluded by presentation of papers of general interest to those concerned with maintenance and operation of electrical equipment in industrial plants. A brief report of the conference follows.



These are the men who planned and ran the meeting. Back Row: Dean J. H. Lampe, Dean of Engineering, N. C. State College; J. T. Meador, Southern Electric Service Co.; C. G. Brennecke, Head, Electrical Engineering Dept., N. C. State College; W. D. Stevenson, Prof. Electrical Engineering, N. C. State College; W. W. Hammond, The Okonite Co.; S. Cowan, Chairman, A.I.E.E. Textile Sub-committee, Factory Insurance Association; and Dan McConnell, Sec'y, A.I.E.E. Textile Sub-committee, Cone Mills Corp.

PANEL DISCUSSIONS*

AS SOON as Dan McConnell, Cone Mills Corp., opened the discussion period, questions came in rapid succession from the audience.

Transformer Oil

The first question presented to the group concerned the reconditioning of transformer oil. "What methods are best to clean transformers and recondition the oil when the transformers are on full time duty, year in and year out?"

It was suggested that the oil be reconditioned while the transformers are in service by filtering the oil through paper filters to clean out the sludge and through activated alumina to remove acid.

There is also an earth type filter available to remove both sludge and acid in one filtering. It was pointed out, however, that reconditioning the oil in service does not clean the sludge from the transformer itself, and therefore is not as satisfactory as taking the equipment out of service and flushing the transformer to clean it before refilling.

There was some discussion of the effect of acid on the oil in the transformer. It was stated that acid reduces the dielectric of the oil and also attacks the metal and the insulation in the transformer.

Ball Bearings

The next question concerned the

greasing of ball bearings on electric motors. This first turned on the question of the advantages and disadvantages of pressure relieving fittings on bearings. Such fittings are designed to prevent packing too much grease in anti-friction bearings.

While several of the mills represented had successfully used pressure relieving fittings, most reported a tendency for these fittings to clog with old grease and cease to do their job. Better results were reported from using the top and bottom plug method in which both

* Sitting on the panel of experts were: L. H. Bartholomew, Monarch Elevator Co.; R. G. Fowler, Cannon Mills Co.; W. T. Becton, Electrical Equipment Co.; Harold Saline, Electric Motor and Repair Co.; Harry Taylor, Southern Electric Service Co.; Fred Snyder, Westinghouse Electric Corp.; and J. R. Adamson, General Electric Co.



Approximately 165 men registered for the two day conference held at North Carolina State College in Raleigh, North Carolina.

plugs are removed when the bearing is greased, and any excess grease is allowed to run out of the bottom plug as the motor is run ten to thirty minutes with the plug open. Here, it was pointed out that the employee lubricating the bearings may forget to put the plugs back in. Even this, however, is not too serious if the proper grease for the job is used, because it should stay in the bearing even with the bottom plug out.

Fred Snyder, of Westinghouse, pointed out that many plants have had excellent results with *permanently sealed bearings*. These bearings are lubricated at the factory

and sealed so that they never need relubrication. When this type of bearing is used, there is no danger of burning up the bearing with too much grease, and grit and dirt are completely sealed out.

Many representatives reported success with this type of sealed bearing, but it was emphasized that these bearings are available with two different types of lubricant, standard and high temperature. And the right type should be selected for each job, or bearing trouble will be frequent.

A specific bearing problem presented to the group concerned the continual failure of the inboard

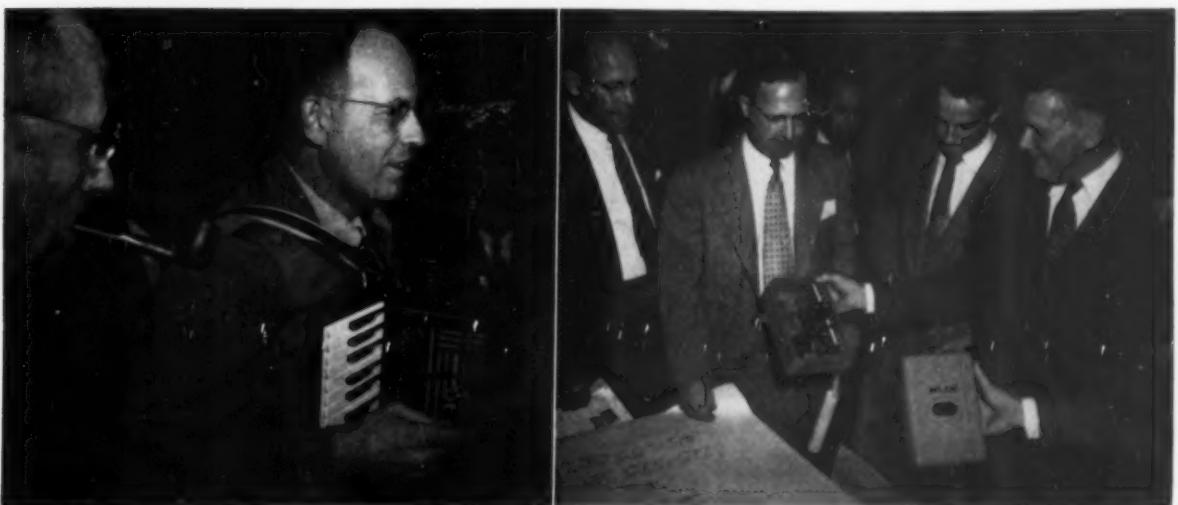
bearing of a motor shaft driving a dryer. The ambient temperature at this bearing is about 360 F, and despite all efforts of the maintenance crew, the bearing failed frequently. Several other representatives had experienced this same trouble, and all had solved the problem to their satisfaction. One had changed successfully from grease to oil lubrication for that bearing, while another had found a grease manufactured by Gulf Oil Corp., called Alvania 2, which successfully lubricated the bearing. Another had found a special Shell grease which worked well. It was also suggested that a heat deflector between the dryer and the bearing might do the job.

Is it wise, one man asked, to tear down and recondition all motors every five or six years on a regular preventative maintenance schedule?

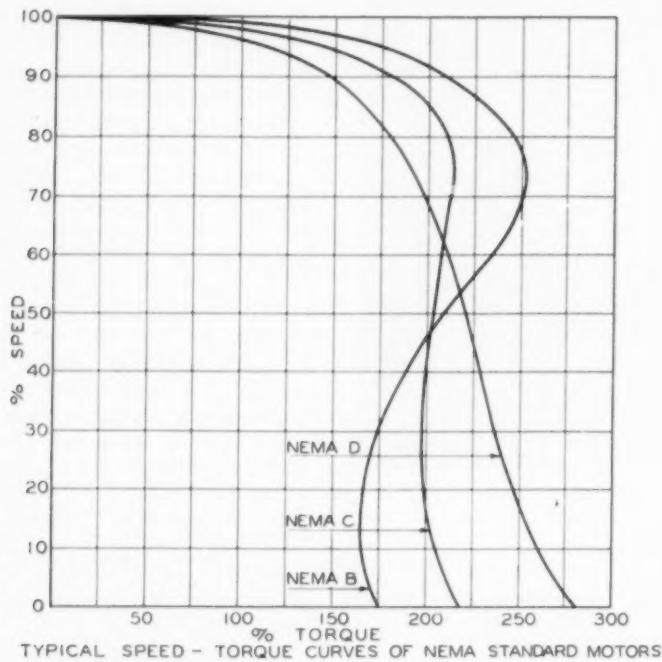
While there was some disagreement on this, it was generally felt that it was not economically feasible to use such a schedule. It was suggested that a few motors be reconditioned and their condition observed on a regular schedule, and then determine whether all motors should be reconditioned on the basis of the condition of the samples. Also, if accurate records of motor maintenance are kept, it will soon be possible to determine a reconditioning schedule that makes sense.

More →

Dan McConnell, of Cone Mills Corp., entertains the group at the barbecue. At the right, a group examines the new G.E. Time-Delay Push Button Station, as it is being demonstrated by G.E. Textile Application Engineer, R. E. Parker, second from left.



Carolina electrical equipment conference (continued)



— OPERATING CAPABILITIES OF A-C MOTORS —

By F. D. Snyder

Westinghouse Electric Corp.
Boston, Mass.

THE ALTERNATING CURRENT squirrel cage motor is the basic motor used in industry. It has the lowest first cost per hp, it has the lowest maintenance, and it is usually the most efficient. Therefore, if a machine is to operate at a constant speed, the first thought should be a squirrel cage motor of standard characteristics and a full voltage linestarter.

The National Electrical Manufacturers Association (NEMA) has set up a series of standards for several types of squirrel cage motors. A knowledge of these standards and what they mean in terms of machinery performance is essential in making proper drive selections.

The curve for the NEMA-B motor shows a starting torque of 175 per cent of full load torque. This means that at the instant full voltage is applied to the motor, this torque is developed. If this torque is sufficient to start the load, the motor starts to turn and accelerate. The actual torque developed by the

motor will vary as the speed increases as shown in accompanying the curve. The NEMA-B motor is the common motor that is in stock in most warehouses.

The NEMA-C motor has a standstill torque somewhat higher than the NEMA-B. The maximum or pull-out torque, however, is somewhat smaller. This motor is intended for applications that require a high break-away torque but have a relatively small amount of inertia to accelerate. A heavily loaded, slow moving conveyor belt would be an ideal application.

The NEMA-D motor has many uses which are not fully appreciated. It has a high slip at full load, which means lower efficiency at steady running. But this motor is ideal for applications requiring frequent starting or where heavy inertia loads are to be accelerated.

Controlled Acceleration. One of the great problems in driving machines is to get controlled acceleration.

A partial solution is the two torque value "soft motor." This motor provides two distinct speed torque curves. It has the advantage of using a simple, full volt-

age starting, magnetic contactor. Either one or the other of the two speed torque curves are available, but never both, without making a change in wiring.

Primary Resistance Starting. It is possible to get any value of speed-torque curve from a squirrel cage motor, lower than its full voltage curve, merely by inserting resistance in the motor leads. A definite time type of resistance starter has been developed for NEMA-B motors. The resistance is first set to give slow acceleration. It is the part-winding starting scheme, where there are two groups of motor coils connected in two parallel starts. With this scheme, an initial connection can be made to get any one of three different starting and accelerating torques. Under normal conditions this will accelerate the machine slowly and smoothly.

The control with the part winding motor scheme consist of two contactors. The operator determines when full torque is to be applied.

ELECTRICAL PROBLEMS AND THEIR REMEDIES

By T. O. Sills

Cannon Mills Co.
Kannapolis, N. C.

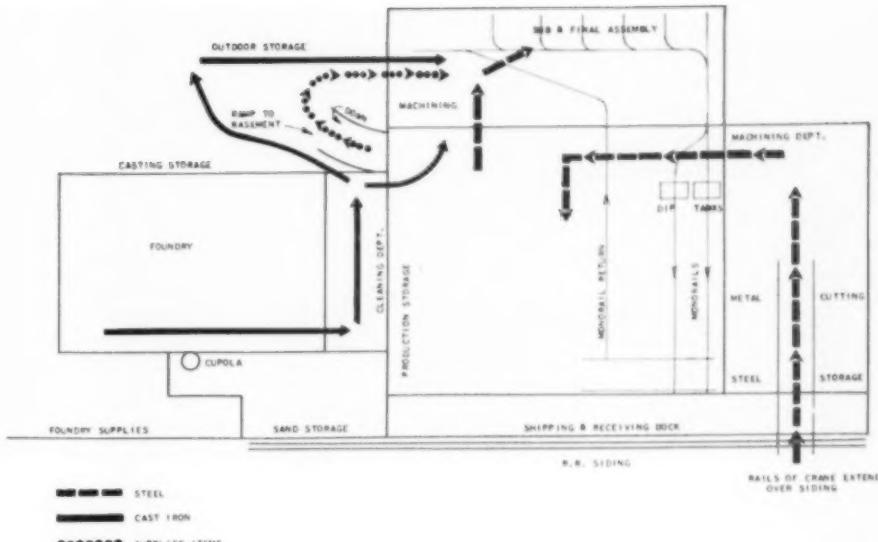
WE HAVE FOUND that certain electrical troubles recur frequently, and high on this list is trouble with loose connections. So far as we can tell, most of these faults are directly attributable to human error. In the case of soldered connections, lack of skill is usually the basic trouble. On solderless connections, carelessness can usually be blamed. We have found torque wrenches helpful for solderless connections.

We have also had recurring trouble resulting from dirty switches and starters. We have tried to overcome this by using definite cleaning and inspection schedules. We have also found that portable vacuum cleaners used in addition to the regular compressed air blowers are helpful in keeping such equipment clean.

The use of ball bearing motors
(Continued on page 49)

Although the plant layout of the Athens Plow Company in Athens, Tenn., requires three lines of material flow to the assembly area—which not only originate at opposite ends of the plant but from two floor levels—the handling system provides smooth material flow at low operating cost.

Material flow diagram of the Athens Plow Company, courtesy of the Baker Industrial Truck Division, The Baker-RauLang Company.



Smooth Material Flow with FORK TRUCKS

Three lines of material flow, from opposite ends of the plant and two floor levels, yet—

THE MATERIAL we use in the manufacture of tractor-drawn discs, plows and tillers falls into three main categories: castings produced by the foundry; components fabricated from incoming raw material; and completely manufactured items received from suppliers. Separate production lines with their own handling systems serve the foundry and the fabricating departments. These two departments are closely coordinated to assure a balanced flow of finished material to the centrally located assembly area.

Fork trucks move the material from the two production departments to this assembly area. The third line of material delivery is from finished parts storage to assembly.

Sheet steel and bar stock move from railroad cars into storage area by means of a crane which travels over the railroad siding. The same overhead crane system is used to move the material from storage to such production machines as the shears, saws and punch presses. Throughout the rest of the production or machining department the material is moved in tote boxes or on skids by fork truck.

The foundry is located on the opposite side of the assembly department. Here, a fork truck moves the castings from the shake-outs to the cleaning department and then to the machining and sub-assembly departments. This truck also delivers material from the basement storage area to sub-

By E. ROY NANKIVELL, JR.,
Plant Engineer
Athens Plow Company, Athens, Tenn.

assembly and main assembly departments. A paved 12 degree ramp, 76 ft long, provides access to the basement storage area for the truck.

Located immediately adjacent to the assembly line is a storage area from which the line draws the individual units of materials as they are required. Assembled units are moved by an overhead conveyor to the paint dip tank, and subsequently to the shipping department. From here the units are taken into boxcars by a 2000 lb capacity three-wheel gasoline powered fork truck.

The economical results obtained by Athens Plow with its Baker fork trucks in coordinating material flow can be attributed to the recognition of two important factors in fork truck applications: Ability to meet anticipated duty cycles and ability to work under adverse operating conditions.



Ashton J. Mouton, Mayor, Mrs. P. J. Le Blanc, Trustee of Finance, and Curtis A. Rodemacher, Trustee of Public Property at the main entrance of the power plant.

Generating Plant Fits Master Plan

RAPID increases in residential and commercial load struck the comparatively small deep-south city of Lafayette, Louisiana with surprising suddenness. First items in high demand by the summer-heat-suffering population of 30,000 were attic-fans, ordinary fans, and (by the more affluent) home air-conditioning units. And in addition, competition in all types of commercial establishments demanded prompt installation of summer air-conditioning units. All this was on top of load build-ups due to increased production of rice, sugar, cotton, yams, and other industrial operations.

It was soon obvious that the city's diesel engine 2.3-kv generating plant and distribution system must be rapidly augmented. Space limitations within the diesel plant precluded adding more units. Therefore, a new diesel or steam plant at another location had to be considered.

An economic study revealed that a steam plant with two 4000 kw turbine-generators would provide the most efficient arrangement. The existing diesel plant would help out during heavy peak periods which, in this area, come during the summer months. The old plant would also be used as a standby at other

By **FRANK E. REEVES**

Senior Electrical Engineer
Barnard and Burk, Consulting Engineers
Baton Rouge, Louisiana

times when one of the steam units was down. A semi-outdoor design was chosen for the steam plant, on account of the mild climate and the saving in building cost.

Design Work

Design work was necessarily performed in four progressive stages:

(1) Preliminary design to determine most suitable types and characteristics of the long-delivery major items of equipment. Specifications were prepared on this basis for bidders on steam-generators, turbine-generators, pumps, fans, switchgear, and transformers. Bids on these items were opened during the latter months of 1949 and contracts awarded about 30 days later.

(2) Plans and specifications for bidders on construction of the power plant building, and on the installation of equipment in and at the plant. These bids were opened during the early part of 1950 and contracts awarded about two weeks later.

(3) Plans and specifications for

bidders on the installation of transformer substations. These bids were opened during the late spring of 1950, and contract was awarded almost immediately.

(4) Revision of plans after receipt of manufacturers' drawings. This phase of the design was carried on simultaneously with erection of the plant and installation of equipment. Drafting work was scheduled so that final drawings were ready before needed by contractors.

It was imperative that the plant be "on-the-line" by the first part of the summer of 1951 since load forecast curves showed that the diesel plant could not handle that peak. The Korean war was not in the cards during the planning stage and the resulting delay in deliveries due to this, and other causes such as strikes at manufacturers' plants, almost upset the schedule. One result was that, due to late delivery of 13.8 kv cable, it became necessary to open the back of a 2.4 kv metal-clad unit and run a circuit through a window of the new plant to tie in with the diesel plant. A badly needed 2000 kw was obtained from the new plant in this manner, and a crisis was averted.

The two steam generators are designed for 700 psi, with 625 psig

General view of the plant from rear showing present stack and boilers and corrugated transite removable walls for future plant expansion.



operating pressure, burning natural gas, with oil standby. Total heating surface is 5802 sq ft. Superheaters are loop pendant type, and automatic superheat control is obtained by auxiliary burners located in the open pass between furnace and superheater, a new feature pioneered by Babcock & Wilcox.

Furnace draft is provided by single-speed, motor-driven, forced draft fans and dual-motor two-speed drives on the induced draft fans. One-way mechanical clutches were originally installed on both motors of the I. D. fans. However,

they were found to be unsatisfactory on the high speed motor due to shock caused by too rapid acceleration of the unloaded motor. These one-way clutches have been replaced with solid couplings.

Turbines are impulse type, 600 psi, 825 F throttle temperature, and have 3 bleed stages and 2½ in. back pressure. Generators are air cooled.

The condensers have two-pass divided water boxes and 5000 sq ft total surface area.

Three boiler feed pumps were installed. Two are motor-driven and the third is steam-turbine driven

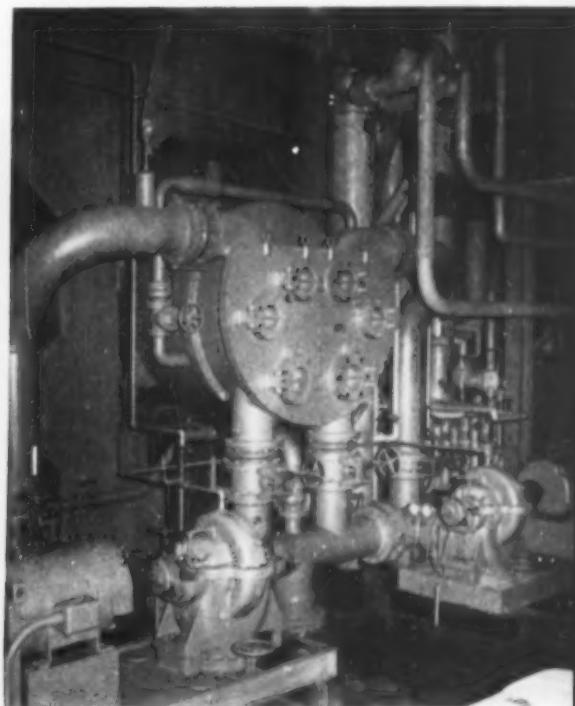
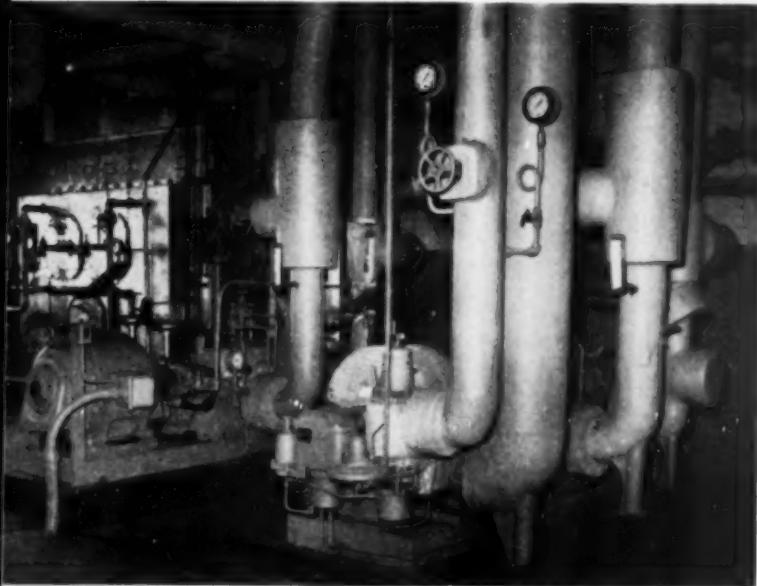
for the desired standby service.

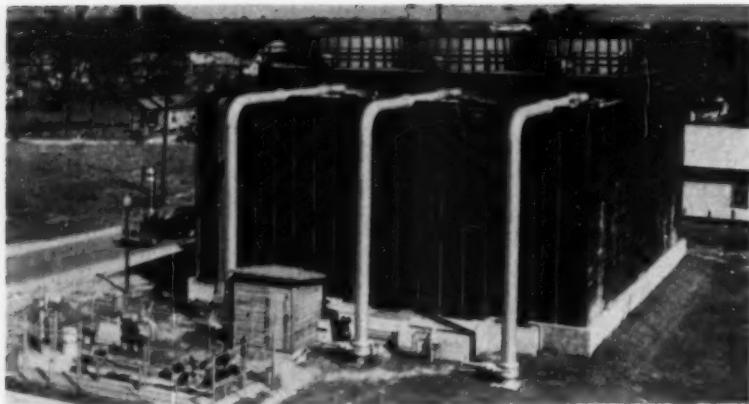
Four, 3800 gpm, motor-driven, single-stage volute pumps are used for circulating water.

Although the plant is located less than 1000 ft from the Vermillion River, a study of river flow conditions and river water temperatures indicated that this source would be inadequate for cooling water purposes. A 15,000 gpm, 3-cell cooling tower was therefore designed and built, for a 13 F approach to a 77 degree wet bulb temperature. The cooling tower size (as well as the condenser size) is considered to be the optimum,

Boiler feed pumps with boiler visible in left background.

Condenser for No. 1 turbine. Condensate pumps at bottom.





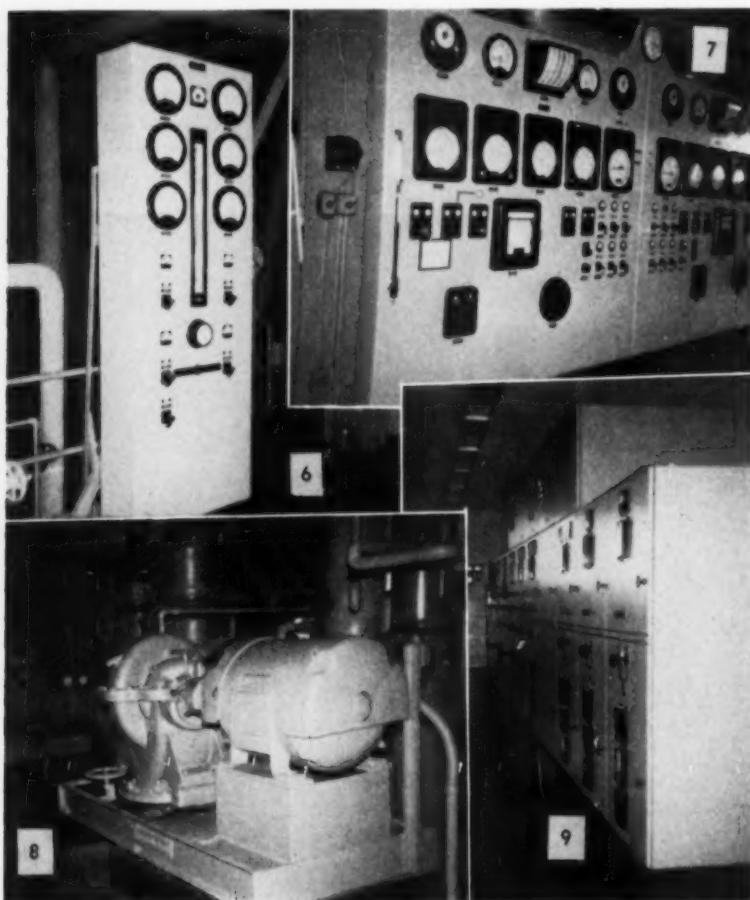
View of cooling tower and gas regulator station from power plant roof.

taking into account the variation in costs and the affect on station efficiency.

Electrical Distribution

Generation at the new plant is at 13.8-kv. Two 13.8-kv tie lines provide for transfer of power in either direction between new and

old plants. Synchronizing is possible at either plant. A third tie line, following a different route, will be installed in 1955, simultaneously with the installation of the third unit—a 7500 kw turbine-generator. In the meantime, the danger of loss of both initial ties (which are on the same pole line) due to cutting down of a pole by



a motor vehicle accident is recognized as a calculated risk.

An initial 13.8-kv feeder, the first leg of a city-skirting closed 13.8-kv ring, feeds a 2.4-kv metal-clad outdoor substation in the heavy college-residential area. (Southwestern Louisiana Institute is located here.)

Load-growth forecast curves, developed in connection with a 30-year Master Plan, indicates the need for a second substation on this ring in 1955, or earlier. Including the substation in the steam plant, and one in the immediate vicinity of the diesel plant, this will make an ultimate total of four 13.8 kv to 2.4 kv substations estimated to be adequate until 1980.

Additional transformers at each of these substations will, of course, be added as needed.

Thorough investigation proved that, with one exception, the substation transformer size could be standardized at 2500 kva, permitting a 2500 kva all-purpose spare. Transformers are all oil-filled, (tap changing under load) with standardized terminals. Stripped down on high and low voltage sides, they are all alike. Differences in throat connections at the various locations offer no problems except some wrench-work when replacing.

Anticipating steam station growth to the year 1980, the 13.8 kv air circuit breakers have an interrupting capacity of 500,000 kva. If generators are added after that date, current-limiting reactors will be necessary in the bus.

At the outdoor substation near the diesel plant, 13.8 kv tie-lines terminate in dummy breakers in the metal-clad switchgear. The 13.8 kv bus tie breaker is run normally open so that each tie line feeds a transformer and row of 2.4-kv switchgear, in unit substation fashion.

If the diesel plant and the steam stations are operating in parallel,

6—Turbine control panel and gauge board

7—Boiler control panel and gauge board

8—Circulating water pumps and condenser

9—13,800 volt switchboard has complete transfer bus in rear.

PRINCIPAL EQUIPMENT—MUNICIPAL PLANT, LAFAYETTE, LOUISIANA

GENERAL DATA

Name of Station	Lafayette Municipal Power Plant
Station Site	Lafayette, Louisiana
Total Generating Capacity	8,000 kw nominal rating
Total Boiler Capacity	120,000 lb/hr continuous
Cooling water Source	Deep wells with cooling tower
Design Engineers	Barnard and Burk, Consulting Engineers, Baton Rouge, Louisiana
General Contractor	Horace B. Rickey, New Orleans, Louisiana

TURBINE-GENERATOR

Turbines	Two, General Electric. Each: 4,000 kw, 3600 rpm, 600 psig, 825 F
Generators	Two, General Electric. Each: direct connected, 4,000 kw, 5,000 kva, 0.80 pf, 209 amp, 12,800 v, 3 phase
Exciters	Two, General Electric. Each: 25 kw, 125 v, direct connected, 2,600 rpm
Generator Coolers	Two, General Electric
Turbine Oil Coolers	Two, Schutte and Koerting

CONDENSING EQUIPMENT

Condenser	Two, Elliott Co., horizontal, two pass, divided water box, 5,000 sq ft cooling surface
Circulating Pumps	Four, Ingersoll-Rand centrifugals, TDH 60, 3,800 gpm, 1175 rpm. Driven by four Elliott Co. 75 hp, 220/440 v, 182/91 amp, 1170 rpm, 3 ph, 60 cycle, electric motors.
Condensate Pumps	Four, Ingersoll-Rand, centrifugals 105 gpm, 1760 rpm, 254 ft head. Hyd. test 575. Driven by four Elliott Co. 20 hp, 220/440 v, 50/25 amp, 1760 rpm, 3 ph, 60 cycle, electric motors.
Air Ejectors	Elliott Co.
Cooling Tower	One, The Marley Company, Inc., wood filled, induced draft, 15,000 gpm

SWITCHBOARD EQUIPMENT

Switchboard Panels	Westinghouse Electric Corp., 12,500 volt main switchboard and accessories.
--------------------	--

STEAM GENERATING EQUIPMENT

Boilers	Two, Babcock and Wilcox, two drum type, boiler surface 4,128 sq ft, water walls 1,664 sq ft, 60,000 lb/hr continuous rating, 625 psig at operating pressure, superheater outlet, 700 psig design.
---------	---

power flow is through 2.4-kv bus tie breakers to an outdoor, metal-clad bus near the diesel plant. Due to the low interrupting capacity of

the existing breakers in the old plant, a series, 3-phase current limiting reactor may be switched into the tie bus if conditions

warrant. The chief operator uses a slide rule chart to determine whether or not conditions require the reactor in the circuit.

Carolina Electrical Conference

(Panel discussions start on page 44)

has reduced the lubrication problem in our plants. We have also found that self-cleaning textile motors reduce our motor maintenance problems. We use a cleaning and lubrication schedule which tells our motor maintenance men exactly what they should be doing every day, week, and month in the year.

In one plant we have kept a motor record on 1888 motors, and it has helped us determine our maintenance costs and permitted us to determine how much we can spend to avoid bearing or winding failures. We found from this record

that 2.34 per cent of our motors (2.75 per cent of installed hp) had winding failures yearly. It also showed that 2.18 per cent of our motors (3.6 per cent installed hp) had bearing failures yearly.

We have, in the past, had considerable trouble with connectors pulling loose to expose conductors in the connections between starters and motors. This trouble occurred when using metallic covered flexible connections. Crews had to work each week-end to repair the connectors. We now are using a flexible rubber-type cord between starters

and motors and find them very good for the job.

One of our major recurring troubles is with grounds. Insulation on conductors breaks because of age, carelessness, haste, or high humidity. To avoid the deterioration of insulation in high humidity areas, we seal conduits in these areas with electrical sealing compounds or patented sealing bushings. It is also helpful to install conduit in the floor instead of under it so that temperature conditions are the same as those in the room, and condensation will be reduced.

Ground detectors are helpful devices in that they lead the maintenance man directly to the fault, and corrections can be made on the spot instead of putting the job off until a week-end.

REPRINTS up to five, free.
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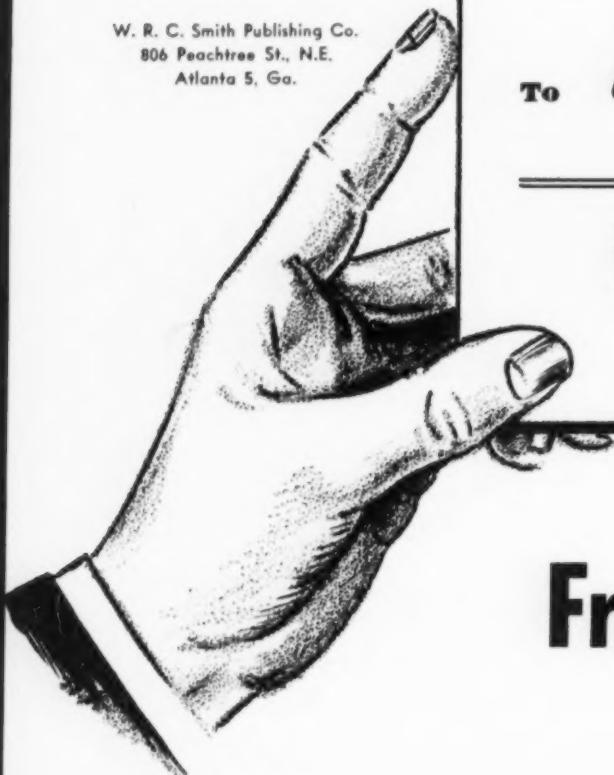
W. R. C. Smith Publishing Co.
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STATEMENT

To *Average American Family*
Main Street, U.S.A.

*Your share of the
Federal debt*

\$5860.00



Freedom Demands a

By HARRY F. BYRD

THE FEDERAL Government is spending your money at the rate of about \$2,500 every time the clock ticks. That is approximately the amount to be paid in federal taxes this year by a man, with a wife and two children, earning \$12,000 a year.

The Federal Government is collecting taxes from you at a rate of more than \$2,200 every second of every day and every night. The per capita income in this country now is estimated at about \$1,700 a year.

The Federal Government is adding to our federal debt, through deficit spending, at the rate of more than \$300 a second.

Federal expenditures in this fiscal year which ends next June 30 will total nearly \$80 billion. Federal revenue will not exceed \$69 billion.

This kind of deficit spending has been going on for a long time. In 21 years the federal budget has been balanced three times. A new generation has reached its majority under federal deficit financing.

When is Insolvency Apparent?

In view of these facts one might well ask himself: When does a Democracy become insolvent? In a system such as ours, when and how does national insolvency manifest itself?

There probably will be no milestone to mark the crossroad, but there are some who may conclude that a Democracy is approaching insolvency when:

(1) We are unable to pay current costs of govern-

ment over a prolonged period with taxes short of confiscation and diminishing returns; and

(2) When the constant cheapening of the dollar is a result of these conditions.

In our short-of-war status, federal taxes—raised three times in one year—did not meet expenditures last year, and expenditures will exceed revenues by more than ten per cent this year. The dollar is now worth 53 cents.

The best tax experts in the country have testified that taxes are already so oppressive they cannot be maintained at present levels for more than a temporary period.

Each new deficit is being piled upon a federal debt

FEDERAL DEBT

SOURCE: U. S. TREASURY

1869 **\$2.2 BILLION**
(After Civil War)

1919 **\$25.2 BILLION**
(After World War I)

1929 **\$16.6 BILLION**
(Roaring Year)

1939 **\$39.9 BILLION**
(Pre-World War II)

1952



In this article the nation's long-time leading exponent of governmental economy points to the desperate need of cutting federal spending and balancing the budget. This is No. 2 in a series on problems of business and government, written exclusively for the W. R. C. Smith publications.

Solvent America

United States Senator from Virginia

already greater than any other nation ever dared create. We went into World War I with a federal debt of less than \$1 billion; we went into World War II with a federal debt of less than \$50 billion. We started this new deficit financing era with a federal debt of more than a quarter of a trillion dollars.

If the integrity of the United States is to be maintained—if we are to remain solvent—we must finance the new debt created by current deficits at the same time we are paying off the old debt obligations which are now coming due. This must be done whether the debt was incurred for war or peace.

With characteristic deception, the Fair Deal economists have been telling us for years that there is nothing wrong with a huge federal debt so long as we owe it to ourselves. But when pay day rolls around we find that we owe it to ourselves in the war bonds we hold, in our bank savings against a rainy day which are invested in the federal debt, in the insurance we bought for the protection of our families which is invested in the federal debt, and in the social



SENATOR BYRD has rendered distinguished service to his country as a member of the Senate since 1933. Prior to that time he was governor of Virginia. He is Chairman of the Joint Congressional Committee on Reduction of Nonessential Federal Expenditures.

security taxes withheld from us against our old age, which are invested in the federal debt.

We find some ten per cent of the taxes the Federal Government takes from us goes to pay ourselves interest. What would happen if we should find that this debt the Federal Government owes us couldn't be met when it comes due; if we couldn't finance it, or if we couldn't pay the interest?

It is the federal debt that stimulates inflation. It is the federal debt that may impair our personal security. The federal debt is a vital factor in the security and preservation of our form of government and the freedoms for which it stands.

Democracy can not survive insolvency. Neither can our free enterprise system. Without the productive

Illustration from
U. S. Chamber
of Commerce



THE AVERAGE FAMILY'S SHARE
OF THIS DEBT IS \$5,860

\$259.0 BILLION

capacity of our free enterprise system we can not hope to deter or resist Russian aggression.

The Intricate Control Pattern Breaks Down in Confusion

Our alternative to free enterprise is socialism. A trend toward socialism is inherent in continued deficit spending, increasing debt, and the resulting economic and social dislocations, including inflation and mounting taxes.

These factors create demands for controls. Controls require more controls, and finally the pattern becomes so intricate that it breaks down in confusion. Prices rise and inflation spirals.

There is demand for additional taxes to halt inflation, and finally taxes reach a point of diminishing returns, suffocating the profit incentive of our free enterprise system in the process.

Then comes the temptation to increase socialism all along the line, including the necessities of life such as food, housing, medical care, and finally the sources of livelihood—business and agriculture.

Socialism, itself, is destructive of all the things that have made our country great. But socialism requires controls. Controls lead to centralization in Washington. Corruption is invariably a product of centralization of purse and authority. This combination can lead only to moral and economic decay.

There are those who have been contending that such are the conditions facing the new administration which is taking over direction of the Federal Government in Washington.

We can continue down the road to state socialism and ultimate disaster, or we can strengthen and revitalize the free enterprise system with solid fiscal policies and go forward, with our head high, as the leader of those who have the will to fight for freedom and independence.

I do not concede that either Democracy or free enterprise, or any other American freedom, has run the course of its usefulness in the world. They have been worth fighting for in the past against both economic and military challenge and I do not concede that they were any dearer to those who have fought for them before, and won, than they are to us today.

But, frankly, we are faced with a federal fiscal crisis. Unless we meet it with courage, we can expect continuing deterioration of our currency and credit, and consequently the destruction of our form of government, our free enterprise system, and all the freedoms for which they stand.

A Sane, Constructive Alternative

What are the alternatives facing the new administration at Washington?

1. *More taxes.* Taxes are already perilously high. Diminishing returns in both revenue and production would be the certain result of more taxes.

2. *More deficit financing.* Besides the problems of financing and managing a debt of more than a quarter of a trillion dollars and all the other treacherous aspects of debt, more of it is bound to generate more inflation which in itself will further undercut what little financial and economic stability there is left.

Only the Federal Government can spend in unlimited

amount. It alone determines the value of money and the extent of credit, because it alone is empowered to do so. When we think of the federal debt we must remember that a federal bond is not simply a loan to the Federal Government on which it pays interest. It is a first mortgage on all we own.

3. *Reduction in nonessential federal expenditures.* This of course is the only safe, sane, responsible and constructive alternative.

The most inflated thing in America today is the Federal Government. Big government costs big money.

Of course, it is absolutely necessary that our military defense should be made impregnable and our efforts toward this end must be supported to the hilt. But the military is the most wasteful segment of our government today. More efficiency through which we would achieve more defense for less money is the first requirement of the new administration.

Beyond this, we must purge the federal budget of every nonessential expenditure. In the first quarter of the current fiscal year federal expenditures exceeded those for the same period last year in the following categories: Agricultural Research Administration, Farmers Home Administration, Forest Service, Production and Marketing Administration, Soil Conservation Service, Civil Service Administration, Public Roads, Economic Stabilization Agency, Civilian Defense Administration, Office of Education, Social Security Administration, Public Housing Administration, Labor Department, postal deficit, State Department, TVA, Coast Guard, Internal Revenue Bureau, and interest on the debt.

In the first quarter of the current fiscal year there were 2,495,519 civilian employees in the Federal Government. This was more by 76,000 than were employed in the same period in the year before. Among the agencies showing substantial increases were the Post Office Department, Civil Service Commission, General Services Administration, TVA, State Department and the military establishment.

The federal budget must be balanced immediately, through reduction in nonessential federal expenditures, and then we must move to reduce taxes, if we are to restore fiscal stability to the United States Government. Financial soundness is the heart of the American system from which our social, economic and military flows.

We are the last free area in the world. If free enterprise democracy in the United States is not preserved, there will be no source of support and reinforcement for either ourselves or our allies.

With no intensification of the war situation, reduction in the federal expenditure level of the current year by \$10 billion without impairment of our security is possible, despite existing commitments and legal requirements. This would virtually balance the federal budget. Within the next two years, under current military requirements, efficiently administered, reduction in the current spending level of \$15 billion should be achieved, thus affording some relief from the present burdensome tax impositions.

This can be done only by courageous and sympathetic action by the new president and the new congress. This must be backed up and promoted by every citizen. Otherwise, it would be too much to expect.

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SMALL amounts of moisture will inevitably penetrate any paint film, causing rust and corrosion . . . but TNEMEC *uses* this moisture to destroy rust at its source!

TNEMEC PIGMENT is a compound which includes and intensifies the preservative properties of Portland cement. Combined with moisture, it creates a neutral condition on steel surfaces, changing active rust and corrosive agents into an inactive neutral compound.

That's the amazingly simple process that makes TNEMEC so outstandingly successful as a prime coat on steel. We invite you to investigate the performance of TNEMEC Primers on any type of installation . . . for adhesion, waterproofness and durability . . . under the most severe conditions. Its record as a long-lasting, anti-corrosive coating is unique.

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MULTICLONE BOOKLET

HELPFUL-INFORMATIVE LINES THEORIES AND BASIC PRINCIPLES OF CENTRIFUGAL FLY ASH RECOVERY!

Or, for special side of pressure, the same Multiclon can even be outlet



FIG. No. 15

Or, in still other shapes to fit specialized applications.

It is readily apparent that conventional cyclones, with their complicated manifolds and the separate inlet and outlet ducts required for each collector, are far more restricted in their adaptability to space limitations.

A further space adaptability feature found in the Multiclon is the unusual flexibility of its inlet and outlet duct arrangements. Where headroom must be kept at a minimum, the Multiclon can be installed with side inlet and side outlet ducts, giving it an "in-line" installation that requires a minimum of vertical height.



FIG. No. 16

20

FIG. No. 17

Or, to be kept at a minimum, permits horizontal installation. The more complicated units make it necessary to provide much space adaptability. Simple conventional cyclone units make it more difficult to install, but instead, the inlet duct is usually at a higher level than the outlet, necessitating much headroom (Fig. 18). In the Multiclon, however, the inlet and outlet ducts are not practical in conventional cyclone units, but instead, the inlet duct is usually at the same level as the outlet, necessitating much headroom (Fig. 18).

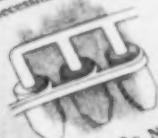


FIG. No. 18

21

32 PAGES OF DIAGRAMS AND INFORMATION

This booklet shows...

MULTICLONE'S SPACE SAVINGS...How the Multiclon requires less square footage, less cubic footage than most other equipment of comparable capacity and performance, thus saving costly plant space!

MULTICLONE'S ADAPTABILITY...How the Multiclon is more adaptable to varying inlet-outlet requirements — to varying space limitations — and is simpler to insulate, thus reducing installation costs!

MULTICLONE'S EFFICIENCY...How Multiclon's multiple small diameter tubes, made possible by its exclusive vane design, give higher centrifugal forces and more complete cleansing of all suspended particles—even small ones of 10 microns and less!

MULTICLONE'S LOW MAINTENANCE...How the Multiclon has no high speed moving parts to repair or replace, no pads or filters to clean or renew, nothing to choke gas flow or increase draft losses as suspended materials are recovered. Multiclon draft losses remain uniformly low—recovery efficiencies uniformly high—at all times!

Make sure that a copy of this helpful booklet is in your reference files by sending for your copy now!

NO MATTER whether you are now using mechanical dust recovery equipment or are planning the installation of such equipment at some future date, here is a booklet that is full of helpful and valuable information on centrifugal dust recovery. It not only explains the basic methods and principles involved, but also shows the important differences between small and large diameter separating tubes, shows how to simplify your duct work and reduce installation costs, and outlines many other important factors to be considered in selecting mechanical dust recovery equipment.

In addition, this informative booklet illustrates and explains how MULTICLONE's unique *vane* design is fundamentally different...how it makes possible greater compactness, simpler installation, high recovery of the small particles as well as the medium and coarser ones, and many other facts on MULTICLONE advanced design.

A limited supply of these booklets is available for free distribution to those interested in mechanical recovery equipment and methods. Write for your copy today.

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A South Carolina mill reports (after equipping a slasher with Yarway Impulse Steam Traps) . . . "For the first time we are actually getting production . . . due to slasher heating up faster on the start and at 'doff' periods."

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Cases of increased production are common where Yarway Impulse Steam Traps are used. They are designed to insure sending maximum premium B.T.U.'s at top temperatures into your process or product . . . to *get equipment hotter, sooner and keep it hot.*

Enjoy these benefits, and others like *easy installation, reduced maintenance and low cost*, by trying Yarway traps in your plant. Stocked and sold by 216 Industrial Distributors. Trained Yarway men also are quickly available to help on your trap problems.



the steam trap designed
with more production in mind

YARNALL-WARING COMPANY Home Office: 116 Mermaid Ave., Philadelphia 18, Pa.

Southern Representative: ROGER A. MARTIN, Bona Allen Building, Atlanta 3, Ga.

INCENTIVES and EDUCATION

Tailored to Meet Needs of Louisiana Plant

By DAVID MARKSTEIN

HOW CAN high production on a per-man basis be assured? How can accidents and safety hazards in the plant be reduced so much that they become hardly a factor at all?

Executives of the Great Southern Box Co., Inc., Southport, La., asked themselves those questions. And they came up with two answers that have worked out so well that, says John B. Massengill, control manager of the plant, "we have never had a fire, even a small one, and we hardly consider accidents as anything which limits production. Furthermore, our production is so high that with two shifts of about 145 men and women, we average 2100 tons of work each month!"

The trick, Mr. Massengill reports, is in a two-edged plan: Education, and incentives. "These are not new ideas in industry, or in the box plant field," he admits, "but what makes any plan click is the way it is tailored to the problem which it is designed to solve. We believe



High production is not necessarily a matter of new machinery or more men. Here, increased efficiency was secured by a double-barreled incentives and education program

that we have tailored our incentive plan and our education program to accomplish what we want done."

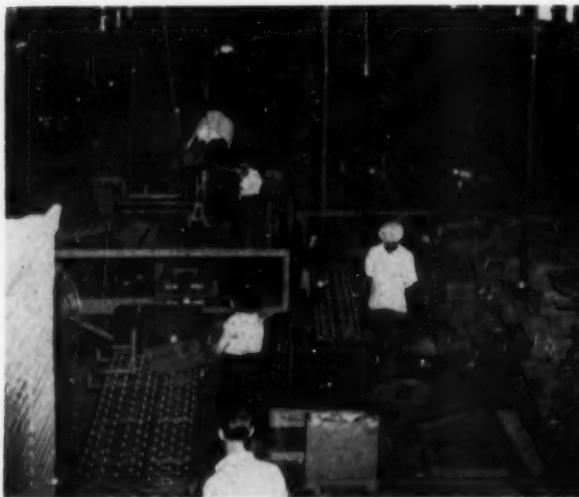
As a beginner, the executives of the Great Southern Box Co., de-

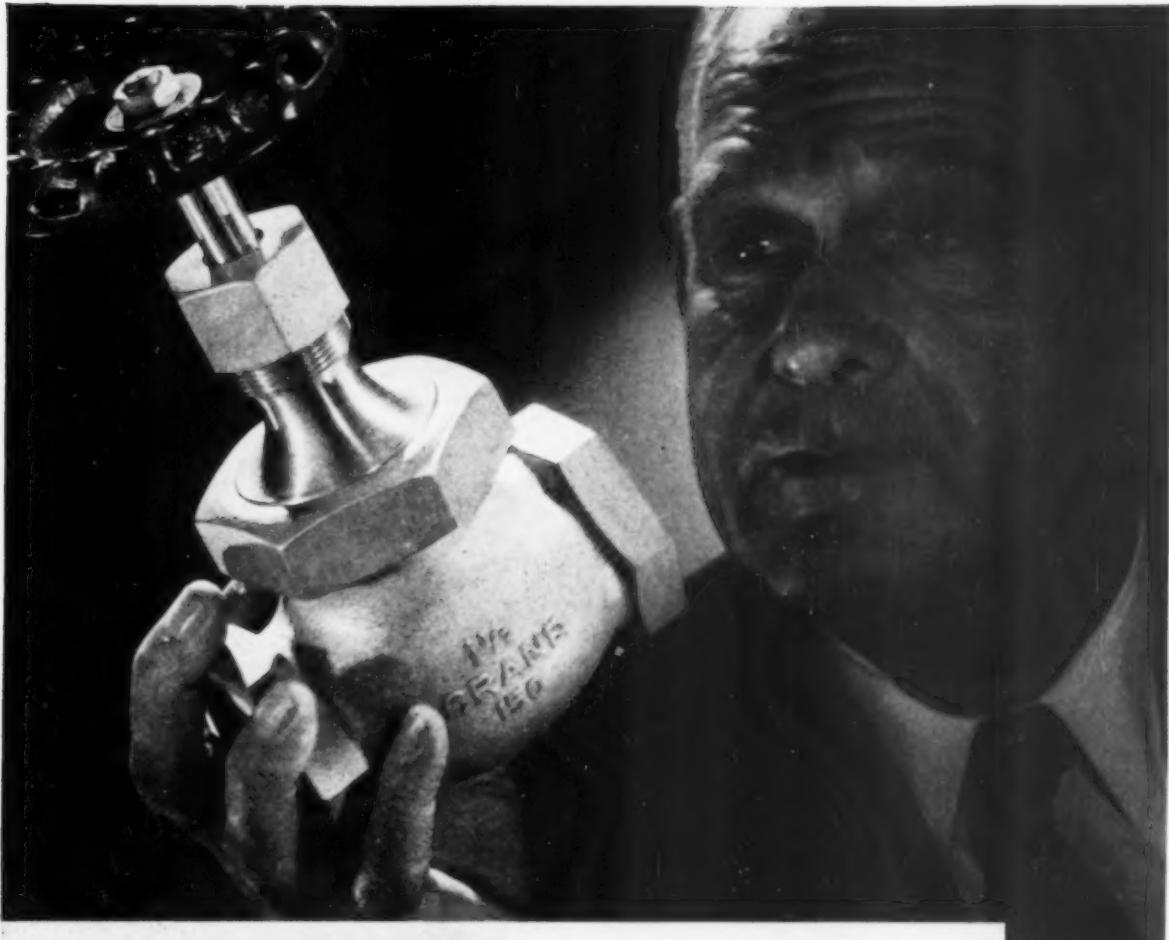
cided to chart their objectives and aims.

"First," says Mr. Massengill, "we naturally wanted high produc-
(Continued on page 112)

This plant has never had a fire. Furthermore, accidents are "so negligible that they are hardly a factor."

If this worker stamps more than the "standard" number of boxes each hour, he gets an incentive bonus.





It's not what you pay - it's what it costs

There probably isn't a thing you buy that you couldn't buy cheaper. Provided, that is, you didn't figure the real cost—provided you weren't concerned with getting your money's worth. Right?

But you are concerned. You buy for longer wear. You buy for freedom from trouble. You buy for fewer repairs . . . for more dependable service. You buy equipment to be worked—not to be laid up. You know that thrifty buying isn't merely price-tag buying.

And it's to you, the thrifty buyer, that we like to sell Crane piping equipment. Whether it's a high pressure, high alloy valve or a $\frac{1}{2}$ " malleable pipe fitting, every unit in the Crane line is built to last longer with fewer repairs and lower servicing costs. That's why year in and year out thrifty buyers have put more Crane Valves in service than any other make.

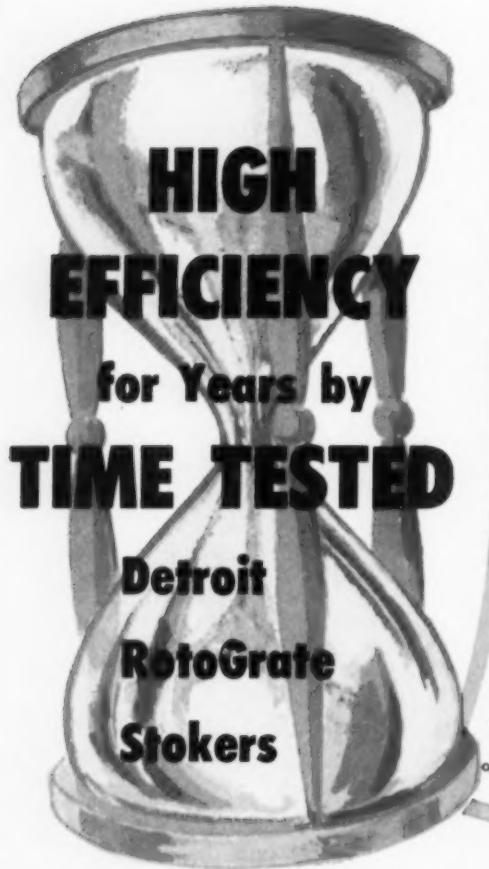
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SOUTHERN POWER & INDUSTRY for JANUARY, 1953



Results of tests of the Mueller Brass new steam generating unit by the consultants were most gratifying. They are typical of Detroit RotoGrate Stoker performance.

Especially important to you as a buyer is the test of time. Performance records of the RotoGrates in hundreds of plants—show high overall thermal efficiency, high availability and extremely low maintenance with all grades of coal.

Write for Detroit RotoGrate Bulletin

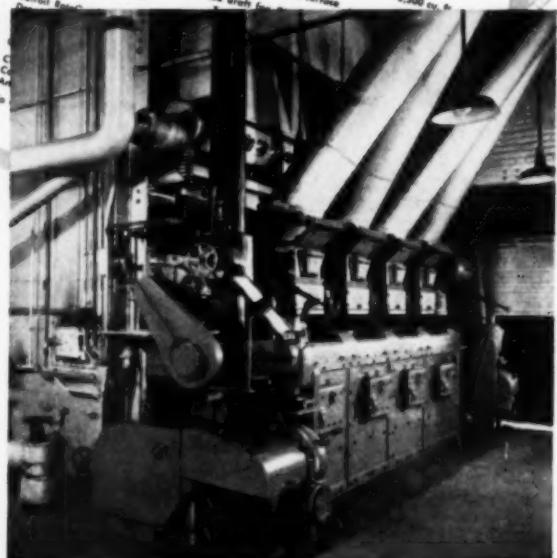
There is a Type and Size Detroit Stoker for Every Industrial Need

RESULTS OF TEST
of
MUELLER BRASS CO.
PORT HURON, MICH.

DETROIT ROTOGRATE STOKER WITH ERIE CITY Outdoor Type 3-Drum Boiler

Test Conducted by
CUMMINS and BARNARD INC.
CONSULTING ENGINEERS
ANN ARBOR, MICH.

Dates of test	June 27 and 28, 1950	Boiler heating surface	8900 sq. ft.
Duration of test	21 hours—44 minutes	Water wall heating surface	2700 sq. ft.
Location and Owner	Mueller Brass Co. Port Huron, Mich.	Superheater design	360° PST, present 750° PST, future
Maker and type of Boiler	Erie City Iron Works 3-Drum	Economizer surface	7344 sq. ft., present 8792 sq. ft., future
Maker and type of Water Walls	Erie City Iron Works Bore Tubes-4 walls, Erie City Iron Works Pendant	Furnace volume	5,300 cu. ft.
Maker and type of Superheater	Foster Wheeler Corp. Extended surface-parallel flow	Boiler, effective gross surface	
Maker and type of Economizer		Formed draft for boiler	
Marker and type of Stoker			
Marker of Dust Collector			
Marker of Fans			
Test Conducted by			
Object of Test			



Detroit RotoGrate Stoker applied to the 110,000 pound unit at Mueller Brass Co., Port Huron, Mich.

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Preventive Maintenance for MOTORS

THE USE of scheduled systems of maintenance for electrical equipment, including motors, has been utilized for many years in various forms. The extremes are great. Some industries leave the checking of equipment wholly up to the production department. We all know that production personnel are not primarily interested in the preservation of equipment; their first interest is production regardless of machine life. It is right that they think in these terms. However, to balance this side of the industrial picture, the plant engineering department must assume the prime function of preventing equipment failures. The practice of running machines until they break down and then repairing them is as outmoded as the Model T.

Many preventive maintenance forms or systems have been developed—both complex and simple. Each has its place. Each has been developed for some one application within some particular plant. No system is applicable to all plants and as the complexity of operations progresses, so must the systems progress.

Discussion of preventive maintenance for motors must be quite general if it is to apply to all industries and plants. Special conditions which include actual operating use, location of the motor in regard to its possible accumulation of dust and dirt, and the amount of time the motor is run continuously are all factors which affect the establishing of a specific schedule. However, in order to assist those companies that have not yet set up a preventive mainte-

Have you been thinking of putting your motor maintenance on a more businesslike basis? If so, here's a guide to get you started. The details must be worked out to fit the exact needs of your plant.

nance program on motors the following data is set down to serve as a guide — details must be worked out to meet exact needs of each plant.

Preventive maintenance is basically the systematized scheduling of inspections and attention to prevent equipment failure. It is designed to reduce costs of repairs and to keep machines and motors operating efficiently at all times with a minimum of production outage. Having established a background we can understand the reasons for the following steps.

Numbers

First, in any system of control one must establish a simple method of identification. Each motor must be assigned a number. Use the prefix M if you desire to differentiate motor numbers from machine numbers.

Forms

Second, develop your form and always carry these items on it:

The material and illustrations presented here are based on information furnished by Mr. C. D. Townsend of Professional Expediting Service. Similar material is contained in his recently published brochure "Preventive Maintenance Manual" which may be purchased at the cost of \$1.50 from Professional Expediting Service, Box 224, West Hartford 7, Conn.

Motor number; manufactured by; hp; type of motor (series, shunt, compound, etc.); motor type (this is on the motor nameplate and is the manufacturer's identification); volts; amperes; phase; cycles. These items are always necessary to properly identify the motor. Other data on your form will vary. It is always recommended that the number of the machine on which the motor is placed appear on the form. Also, it is of value to have included the application and the date of installation. However, these details depend upon individual needs and cannot be included as a general rule to follow. The accompanying forms illustrate much of the data needed even in a complex system for controlling motor maintenance.

Schedules

The third step after getting the form developed and the motors catalogued is to determine the inspection schedule and set up the items to be checked on this schedule. This is the most important part of preventive maintenance. It is the heart of the control procedure. Without properly established cycles of inspection preventive maintenance cannot function as a cost reduction item.

Correct timing of the scheduling

Does it meet the needs of your plant?

There will be special maintenance work that you find must be included in the weekly and yearly inspections schedule. To determine just what items shall be included on the list for attention at the various inspections, recourse may be had to excellent bulletins available from the principal motor manufacturers.

After a controlled preventive maintenance program for motors and starters has been set up, the one in charge should check with comparable plants in his area to determine what procedures have been found best. He should particularly investigate maintenance peculiarities of his type of operation and area.

Having made sure that he understands generally the specific needs of his operation, he can rely almost exclusively upon data furnished by the equipment manufacturers for filling in details and developing a workable and effective program.

is not an established element which can be set down on paper and be followed from then on. It must be flexible and be frequently reviewed. Changing operating conditions and application of the motor may affect the timing of inspection.

Yearly Inspections

Many companies however have found certain standards acceptable. The basic one is complete examination and repair of the motor at least once each year. This includes the actual taking apart

of the motor, cleaning, checking, repairing and replacing of worn parts. It actually is a motor re-conditioning. This schedule is worked into the yearly master schedule so that the maintenance work is properly distributed—perhaps one or two motors each month or several each week depending on total volume of the job. The number scheduled during a month depends upon two things: first, the available manpower; and second, the number of motors in operation more than six months each year. Motors not operating

six months or more are scheduled over a longer period but always by the time they have run one year.

Weekly Inspections

Another more or less standard procedure is to establish a weekly inspection which is usually a combination of lubrication and inspection. This short period inspection and lubrication schedule also depends on the conditions in your plant, not abstract recommendations.

As a guide for inspectors and repairmen the various items to be covered must be listed along with a time schedule.

What to Check

As previously mentioned, the needs of individual equipment are so varied that it is futile to enumerate here the various elements that should be covered in scheduled inspection. Therefore, we only mention a few items to illustrate the general character of inspections and repairs that might be included under weekly, semi-annual, and yearly inspections.

Weekly:

Weekly inspection would cover such items as checking the oil levels in sleeve bearings and seeing

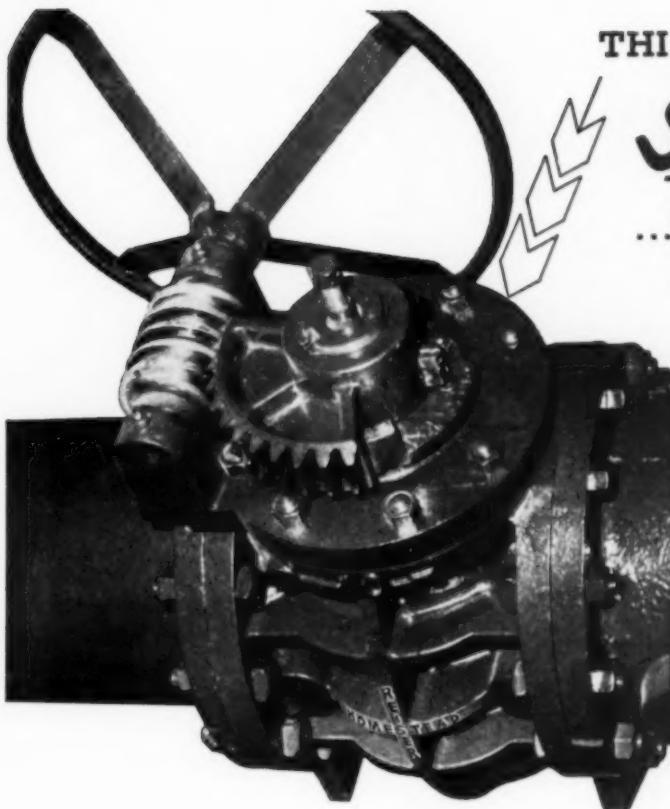
(Continued on page 114)

MOTOR PARTS & CONTROL DATA				RENEWAL PARTS PUBLICATION NO.	
MOTOR NO.	No Per Motor	Style No.		Starter & Switch Parts	
Name of Motor Parts					
Rotor or Armature Coils			Coil		
Stator Coils			Movable Contact		
Field Coils - Shunt			Stationary Contact		
Field Coils - Series			Contactor		
Field Coils Commutating			Push Button Contact		
Assm Seg or Coil Rings					
Brushes					
Brush Holders					
Brush Holder Springs					
Brush Holder Fingers					
MACHINE NO.				MACHINE MAINTENANCE & COST	
JOB NO.	DATE		DESCRIPTION OF WORK		
MOTOR & CONTROL DATA				RENEWAL PARTS PUBLICATION NO.	
MOTOR NO.	MANUFACTURED BY				
MACHINE NO.	SHUNT			COMPOUND	
H.P.	SERIES			FRAME	
SYNCHRONOUS	INDUCTION			CYCLES	
SPEED	VOLTS		AMPERES	PHASE	
TEMPERATURE RISE				EXCITATION AMPS	
ROTOR OR ARM. SEE NO.				MODEL NO.	
FORM NO.					
MFGRS. ORDER NO.					
CONNECTION DIAGRAM					
SAFETY SWITCH MFGRS.					
VOLTS	AM				
H.P. Cycle RPM Serial No.					
Volt Phase Shaft Type					
Date Oiled or Greased Condition Date Repair By Whom Troubles					
LINE STARTER: MFGRS. N					
VOLTS H.P.					
COIL					

Develop Your Own Forms

These sections of typical forms illustrate some of the data needed for efficient electric motor maintenance. Always include motor number, manufacturer, volts, amperes, phase and cycles.

It is also recommended that the number of the machine on which the motor is placed appear on the form. Application and date of installation can be included. Details depend upon individual needs.



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Seals itself
...THAT AUTOMATICALLY
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Extra-long, leakless service . . . more operations between lubrications—up to 22 times more by actual tests with other well-known lubricated plug valves . . . less maintenance and lower plant operating costs result from their use.



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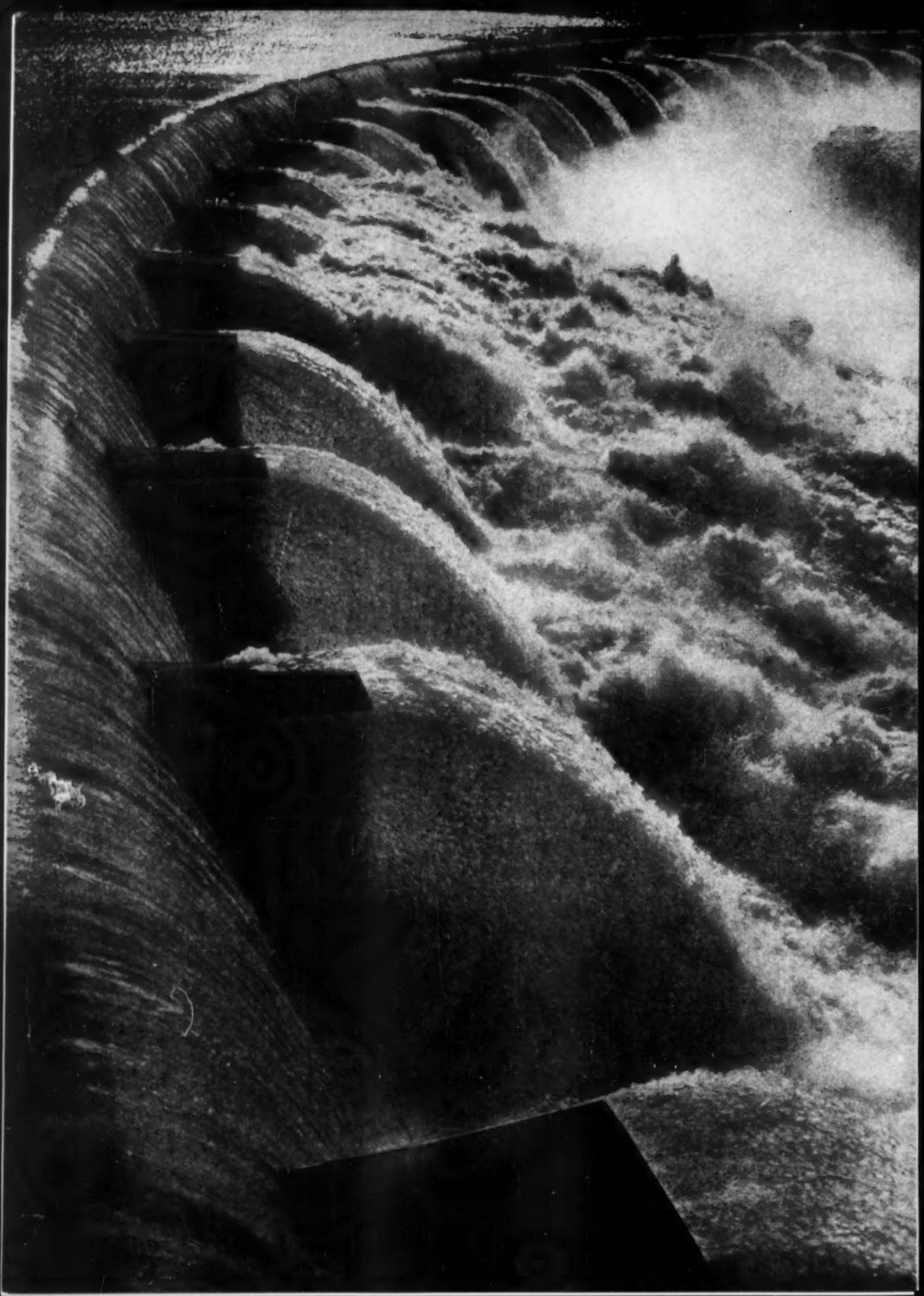
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Sectional View of Full Port Area Homestead-Reiser Valve

Available in Straight-Way
and 3-Way—screwed or
flanged ends.



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water conditioning

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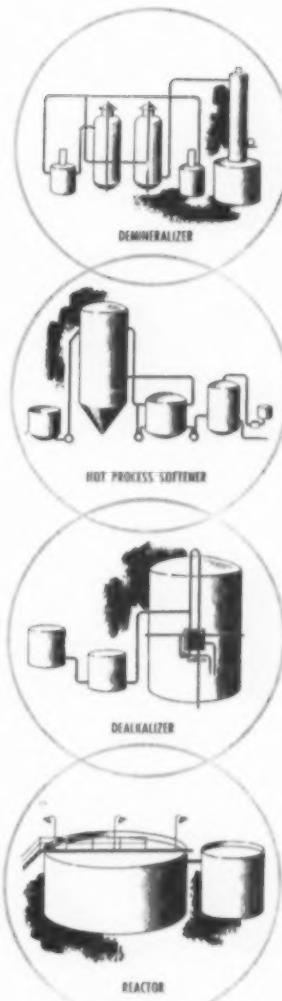
Nature's purest water will not meet the stringent requirements of modern industrial processing. The presence of minerals, salts or gases makes it unsuitable or uneconomical for direct use. Profitable elimination of corrosive or process retarding elements requires specialized experience such as furnished by Cochrane Water Engineers.

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To any water conditioning problem Cochrane contributes 89 years of accumulated "know-how". Whether your requirements are for process water or boiler feedwater, Cochrane can show you how to obtain them—economically and efficiently. And since Cochrane manufactures all types of water conditioning equipment, you are assured unbiased recommendations.

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Construction and selection of

Rubber CONVEYOR BELTING

plus tips on prolonging belt life

Adapted from data furnished by FRED MATHEIS of the Thermoid Company

THREE ARE many different types of conveyor belts available today for a wide variety of both standard and special service but all belts have a similar construction consisting essentially of carcass and cover. The belt carcass is made up of one or more plies of fabric duck in which the lengthwise (warp) threads are woven over and under the cross (filler) threads thus giving a distinctive elastic quality in the direction of travel. The warp threads provide the primary strength of the belt.

New belts are constantly being designed to handle new tasks. Section of a special conveyor belt for cooling cans of pineapple, 200 ft long, 6 in. wide, 4 ply, is shown below. In a 5 minute upward travel against stream of cold water, cans cool from 195 F to 90 F. Lugs molded alternately on sides cause cans to roll and tumble for quick heat reduction of entire contents.

Center view shows a section of flanged belt conveyor. This

Duck is specified by the weight per linear yard (42 in. width) such as 28 oz, 32 oz, 35 oz, and 45 oz. When belting is subjected to severe flexing conditions, a thin sheet of rubber between the plies, known as a "skim" is advantageous.

Covers for conveyor belts are compounded of natural and synthetic rubber stocks together with other ingredients which vary according to the service for which the belt is intended. A smooth rubber surface is normally used and is furnished in various thicknesses to

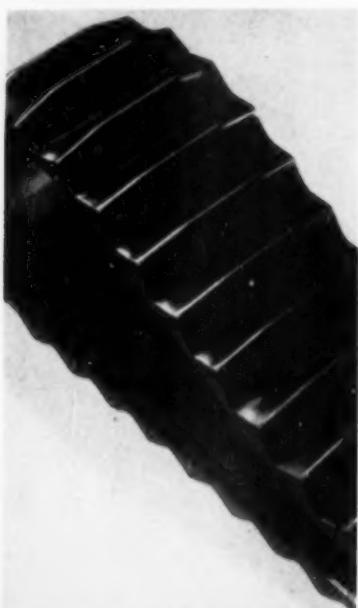
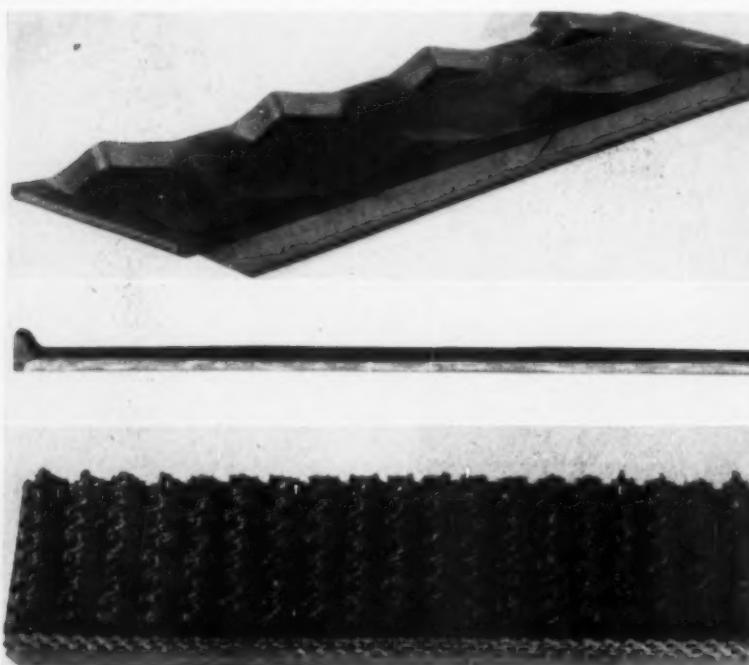
resist abrasion, heat, cutting, and gouging. For severe service, a breaker strip is inserted under the cover. This is a ply of open mesh fabric, which increases cover adhesion for maximum resistance to cover separation.

Although each ply of the belt carcass usually extends completely across the width of the belt, a special type is available which is known as step-ply construction. The belt thickness is uniform but a thicker layer of rubber is provided in the center and additional duck

belt is available with covers of "Eye-Easy" colors as well as black.

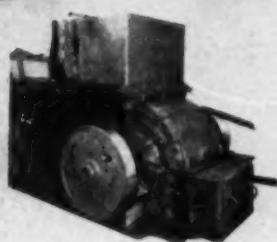
"Ruff Top" belting (bottom left) is characterized by a surface with thousands of gripper points of irregular shape which prevent back-slip when conveying cartons, boxes and packaged materials up an incline.

Transverse grooves molded into the cover of the special belt shown below enable it to carry short rods and bolts.

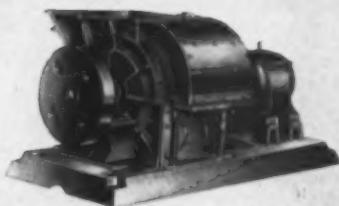


Illustrations Courtesy
of the Thermoid Company

FOR HIGH TONNAGE CRUSHING . . .

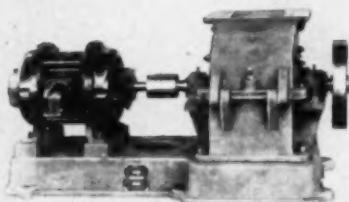


Heavy Duty 30-S. For Primary Crushing. Crushes ROM coal, rock, slate, sulphur balls and gob—high tonnage without oversize. Saves labor costs of pickers.

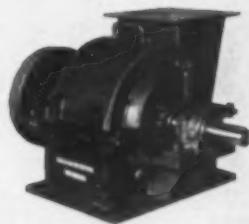


"S" Series. 9 sizes. Capacities up to 500 TPH. High tonnage with minimum fines. Well suited to power plants.

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Laboratory Mill. 2 sizes. Capacities up to 2000 lbs./hr. Very efficient for coal sampling.

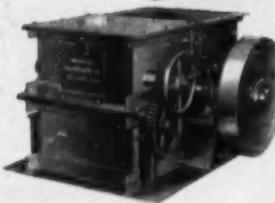


"13" Series. Three sizes. Capacity up to 6 TPH. For experimental runs, testing, and pilot plant operations.

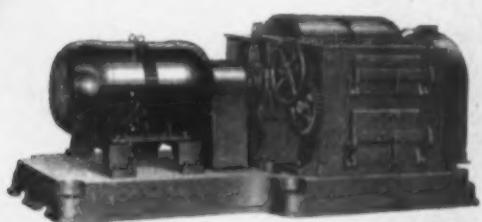
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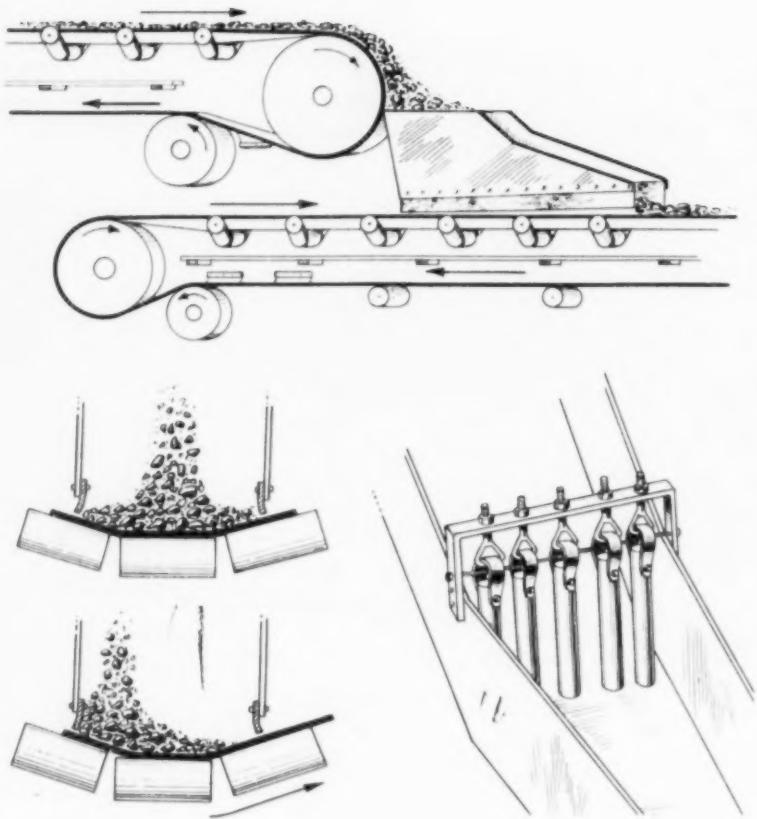
One of the basic requirements for long belt life is that the material must fall on the belt while moving in the same direction and at the same speed (right) as the belt.

Material should be directed on the center of the belt, not toward one side. Material falling on the left side will make the belt ride out toward the right and vice versa. As a result, (note illustration) the belt will not train properly and will rub against guard boards and training idlers, increasing edge wear.

When lumpy material is being carried, an attempt should be made to have such material cushioned by a pre-laid layer of fine material. A screen or "grizzly" at the bottom of the loading chute will satisfactorily deposit a layer of fines over the belting, thus providing protection against bruising. In some instances an oval or "fish tail" notch cut in the lip of the chute will aid in pre-laying the fines.

At the same time, the velocity of loading-material flow should be controlled by pitching the loading chute properly. If this is not feasible, a baffle of iron or wooden bars should be constructed in the chute (bottom, right), suspended from the top and free-swinging at the bottom, to reduce the velocity of material flow onto the belt.

In like manner, the vertical distance between chute and belting should be small to prevent excessive velocity of material which in the case of lumpy material, might be great enough to cause belt damage.



plies at the sides. This construction is to be considered when there is extreme wear in the middle of the belt as is found in handling abrasive materials.

Usually, in industrial plants the top cover is thicker than the bottom cover because the top cover is subjected to the most wear but there is a trend today toward use of thicker covers on the bottom in severe, abrasive service to cope with bottom cover wear.

Although a smooth surface belt is accepted as standard in most fields it may be of interest to know about some of the special belts that are available. The jobs done by standard and special belts in all types of industry are amazing and new belts are constantly being designed to handle new tasks. The canning industry uses a belt with a special, white, acid-resistant cover which does not impart odor or taste to food in canning factories. This belt can easily be cleaned to prevent accumulation of food in the pores of the belt.

Another belt is made for operating in temperatures from 270F to

350F. The carcass is composed of specially-treated glass fabric and the carcass is incased in a special heat-resistant fabric envelope. A ply of asbestos is added under the cover for additional insulating properties. Several other types of specially designed belts are illustrated.

In cases where long belts are required by special conditions, rayon duck or rayon cord can be used in the carcass for extra tensile strength instead of cotton. In rare instances steel wire or cable is used

for extra strength where the center to center distance of pulleys measures thousands of feet but steel-cable belts are almost prohibitively expensive.

Belt Selection

To choose the **correct type** of belt from the many constructions available, consider first the size, density and sharpness of the pieces of material. Large pieces of heavy rock in sharp fragments will require a belt with a thick cover, breaker strip and several plies with skims. Light, fine material can be moved on a less rugged belt.

Allow for extremes of temperature of both material and working environment. Belts for both hot and cold materials and climates can be produced.

Moisture content of the material is important. Wet mixtures take a different belt than dry ones.

Material in fine sizes, if abrasive, may require heavy cover in spite of the small particles. Belt color is important in some industries. Consider specifying special molded covers for handling standard parts

BELT MAINTENANCE DATA

An extensively illustrated discussion of rubber conveyor belt maintenance will be featured in the February issue of *SP&I*.

Pre-installation maintenance factors will be emphasized. Simple tools and procedures to help the maintenance man give belting proper attention will be illustrated. This maintenance data will also be adapted from data furnished by Fred Matheis, Assistant Vice-President, the *Thermoid Company*, of Trenton, N. J. — manufacturers of conveyor and elevator belting, transmission belting, V-belts, wrapped and molded hose, rubber sheet packings, industrial brake linings and friction materials.



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welding ends.
One of many
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in manufacturing plants such as the belt conveyor.

Width and Number of Plies

The size of the belt is dependent upon the rate at which the material is to be moved, the distance, horsepower required to move the loaded belt.

In general, the wider the belt, the greater the cost. It is axiomatic that for a given tonnage per hour, the faster the belt travels, the narrower the belt required. However, the faster the belt runs, the more often it will pass the loading point and the greater will be the wear and maintenance. So it may not pay, in the long run, to save on the first cost of conveyor belting by running a narrower belt at high speed. And, conversely, the capital cost of belting is likely to be excessively high if a very wide belt is run at relatively slow speeds. A break-even point should be calculated in which a great many factors must be considered.

For example, a high-speed belt requires more expensive rollers. On the other hand, a wide, slow-speed, belt will take longer rollers which may be just as expensive. The high-speed rollers will require more attention after installation. Fortunately, there are many tables, formulae and standard practice guides to assist the design engineer in making his choice.

A well-proportioned belt has enough plies to support the load and withstand tension. It must be flexible enough to trough and bend over pulleys without excessively stressing the belt. In general, the minimum ply belt to support the live load also satisfies tension requirements. On flat travel over short distances, the belt operates below tension capacity. Refer to manufacturers' manuals for tables and formulae in choosing a well-proportioned belt.

Prolong Belt Life

The edges of a belt are carefully sealed in manufacture to prevent moisture from getting into the belt. Excessive edge wear destroys the edge seal. Water will then attack the carcass causing mildew and rot. If the water freezes, the ice particles will rapidly destroy the belt.

Edge wear is considered by many specialists to be one of the chief

causes of short belt life, and misalignment is a large factor in edge wear. It is absolutely essential for long belt life and that the belt carriers be correctly aligned. It generally pays off in terms of increased belt life to take considerable time and trouble to secure as close to perfect alignment as possible. Many installations are aligned with a transit. Reducing edge wear usually means a reduction in power.

It is becoming standard practice to compensate for excessive edge wear by cutting off the worn edges before the belt has completely disintegrated and using the reclaimed, narrower belt in less severe service. New liquid neoprene compounds are available for sealing the newly formed edges against moisture. Liquid neoprene is also useful in building up worn spots in the cover to prevent more extensive repairs later.

Skirt boards are another primary source of edge-wear. Construction and placement must be carefully engineered by qualified personnel. The use of jerry-built, "baling wire" contrivances should be avoided. Fasten skirt-boards firmly so that they will not eventually loosen and drag on the belt.

Loading Impact

Loading conditions are a prime factor in belting deterioration. The loading point is a danger zone. Both existing and proposed installations should be regarded with the intention of creating "ideal" loading conditions.

Several of the basic requirements for long belt life are illustrated. Note how material should fall on the belt. It should not strike the belt directly above a solid pulley because the resulting hammer-anvil action will quickly render the belting unuseable. The chute should be located so that material will strike the belt between idlers. However, in

cases where heavy material is being loaded, it may be necessary to load directly over rubber covered or pneumatic idlers.

In some cases, impact load between idlers will set up belt vibration. Resultant chattering may depress the belt sufficiently to allow material to escape under the skirt-boards. This may be prevented by locating the chute so that loading material will strike the belt far enough ahead of the tail pulley to allow insertion of at least one belt-stabilizing carrier pulley. Also, carrier pulleys should be more closely spaced around the loading zone because of the impact loading of belt at that point.

Design Chutes Properly

Construction of loading chute skirt-boards and flexible skirts should be carefully considered. Skirt-boards should not touch the belt but should be positioned slightly above the belt. They should be long enough to settle the material before it leaves the loading area. Flexible skirts are preferably improvised from rubber-covered edges of belting remnant. These remnants should be placed so that the rubber-covered edge is next to but not touching the belting. Should this be reversed, and the exposed-fabric edge of remnant placed against the moving belt, grit will collect in the fabric. Resultant abrasive action will, in time, wear a track through the belt cover.

Vertical spacing between chute skirt-boards and belt should increase toward the open end of the chute. Thus the width of flexible skirts, as cut from a belt remnant, should decrease in the direction of belt travel. This construction minimizes spillage around the loading point. At the same time, wedged-in lumps of material will work themselves free by the forward motion of belting.

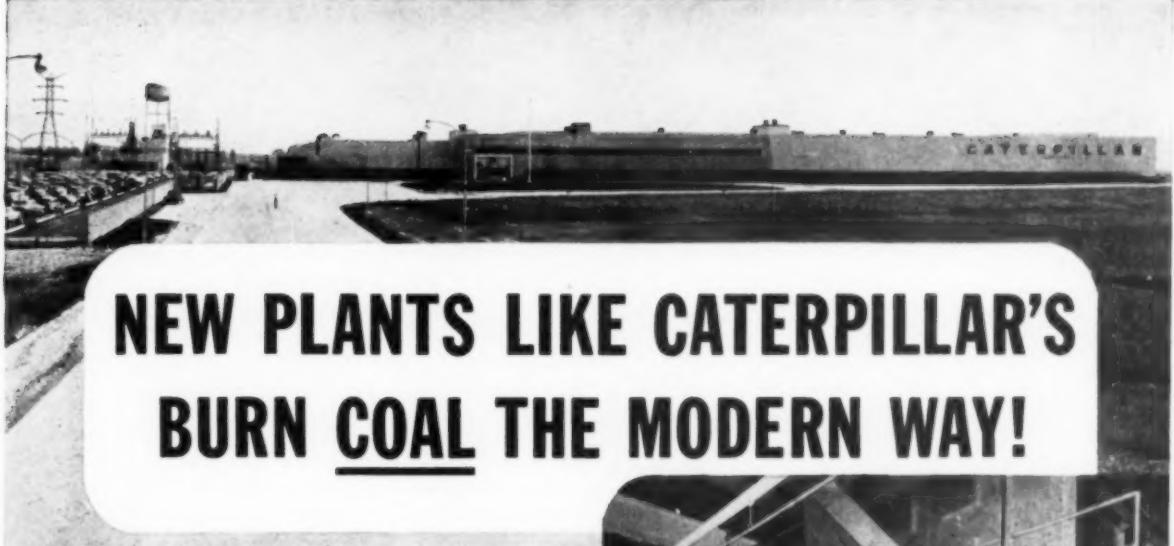
Plant Electricians Please Note:

Three of the feature articles in this issue of SP&I will be of special help to you for on-the-job operation and maintenance.

Note page 42—Report on a recent Carolina Electrical Equipment Conference discusses troubles and remedies in everyday operation and maintenance.

Note page 59—Here's a special guide to help you get started on Preventive Maintenance for Motors.

Note page 72—An elaborate Question & Answer discussion of Electrical Equipment Fundamentals. This is based on "plant-tested" methods from the Pasco Packing Company of Dade City, Florida.

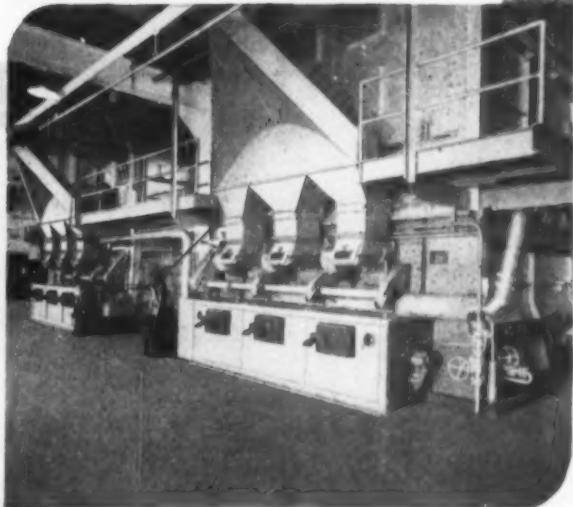


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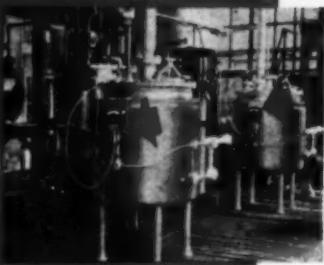
PLATING

In copper and chromium plating of rotogravure rolls, the temperature of plating solutions is held to within $\frac{1}{2}$ °F by Sarco Electric Indicating Temperature Controllers. Photo taken in Southern Gravure Service plant, Louisville, Ky.



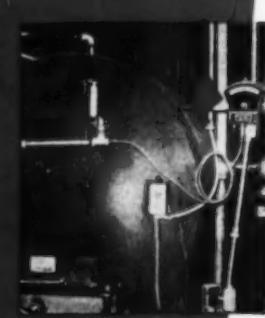
CHEMICAL

Hoffman La Roche Pharmaceutical Co., Nutley, N. J.—the jacket water temperature of these stills must be held to within $\frac{1}{2}$ °F. For the past 9 years, Sarco LSI Indicating Temperature Controllers have been doing that job.



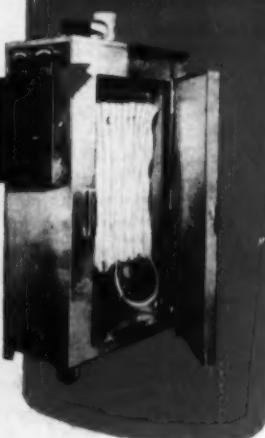
FOOD

Chocolate milk and soft drinks in bottles and cans are processed in Fort Wayne Sterilizers. Many users equip these Sterilizers with Sarco LSI Electric Indicating Controllers to hold the temperature to within $\frac{1}{2}$ °F. Hook-up sketches and case histories on request.



TEXTILE

The Buckus Hosiery Conditioner processes 15 denier nylon hosiery—40 dozen per 1 hour cycle. The humidity and dry heat are controlled by two Sarco Electric Indicating Temperature Controllers. Over 500 LSI's have been factory-installed on these Conditioners by Buckus Machine Works, Carlstadt, N. J.



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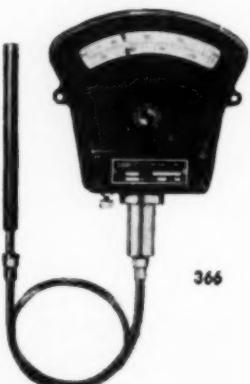
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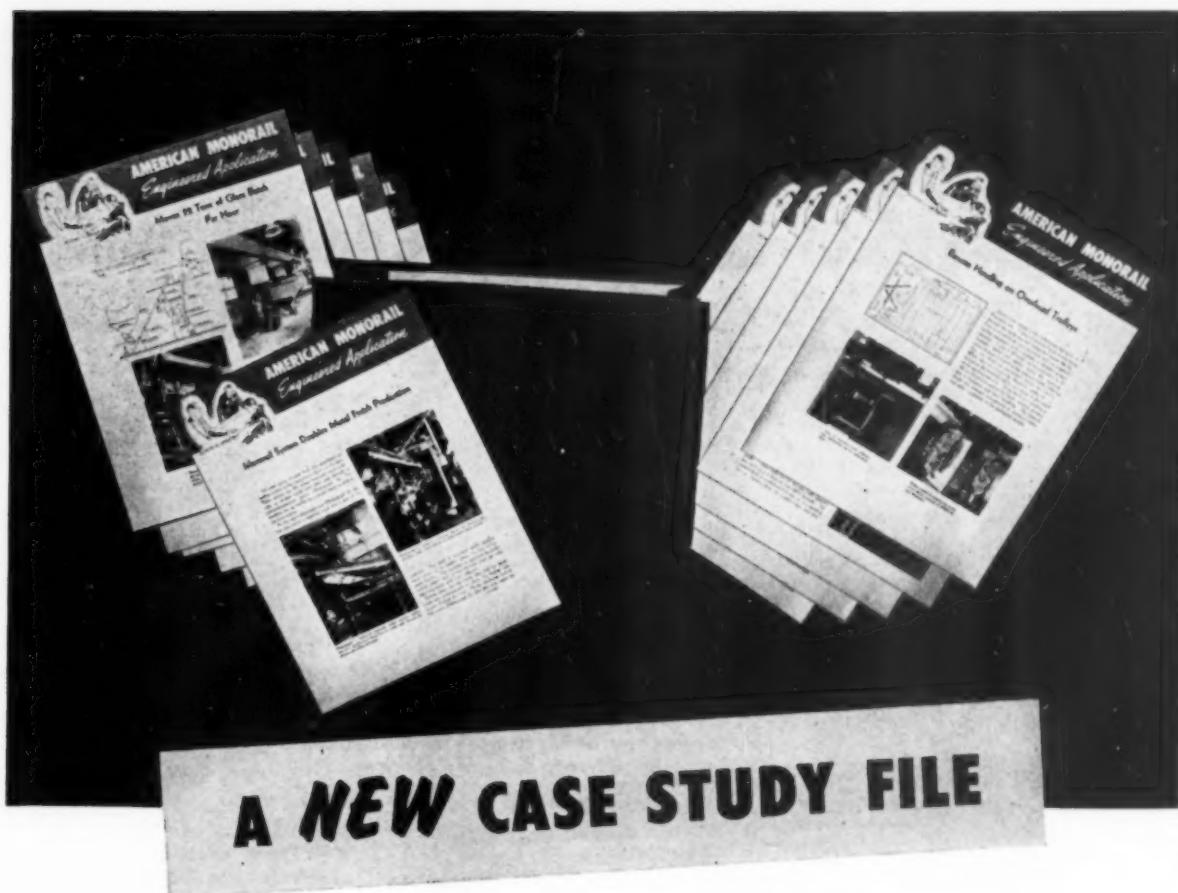
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your business letterhead)

"Q & A" for the Man-in-the-Plant

Electrical Equipment Fundamentals

By A. T. LOHKAMP, Superintendent of Power Plant,
Pasco Packing Co., Dade City, Florida

Q—What causes sparking of exciter commutators or motor slip rings?

A—Sparking may be caused by dirt or grease on the commutator, brushes being too hard, mica being too high between commutator bars, brushes too short, not enough spring tension on top of the brush, or brush holder in wrong position.

Q—How is all electric current generated, a-c or d-c?

A—All current is generated as a-c. As the coil windings cut the flux between poles, electric current is generated. The rotating coil is a continuous coil with both ends connected to the slip rings so that when one side of the coil is moving upward the current is moving in one direction, when it is moving downward the current flows in the other direction. One is +, the other is —. Between the two the current is zero. In modern generators the field coils rotate and coils are imbedded in the stator but the same idea applies.

Q—What is a commutator; what is its purpose?

A—A commutator is composed of a series of copper bars separated by mica or a good insulating material. Each bar is soldered or connected to one end of two coils so that no complete coil is connected to one bar. By means of carbon brushes the generated alternating current is delivered to the generator terminals as d-c. As the generator rotates there is a definite break of contact when the generator current goes to zero and instead of an alternation between + and — on the same lead all cur-

Part I—Operation and Maintenance

This is the first of a series of 7 "Q & A" articles presented to help plant men become more intimately acquainted with the electrical equipment in their charge. A thorough understanding of the points covered will improve operation and maintenance, and help employees advance to higher positions.

Future installments will cover: Part 2—Distribution and Controls; Part 3—Synchronous Motors; Part 4—Three Phase Induction Motors; Part 5—Single Phase Motors; Part 6—Technical and Design Data; Part 7—Selecting Generators and Motors.

rent is either straight line + or straight line —.

Q—Why are a-c generators built with rotating field coils or poles instead of rotating the windings between coils?

A—By making the field coils or poles the rotating element a relatively small amount of current has to be handled by carbon brushes and slip rings since only the d-c exciting current has to be handled. If the coils were rotated between the poles all of the a-c current generated would have to be handled by slip rings and brushes. In machines of 100,000 kw and even much smaller, this would be quite a job. As it is, the a-c current can be taken from the generator by leads fastened directly to the coil ends. The fields or poles make a smaller rotating mass than would all of the stator coils so higher speeds of rotation can be used. It would be virtually impossible to rotate all of the

coils required on a stator at 3600 rpm, and impossible to insulate the slip rings.

Q—What is frequency?

A—In generating a-c current the frequency is the number of cycles or alternations per second. One cycle or alternation is the build-up of current from zero to maximum positive back down through zero to the greatest negative and back to zero.

Q—What is an Ampere?

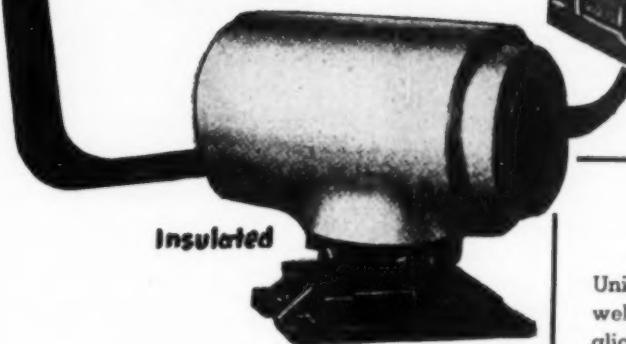
A—The ampere is the unit used to measure the amount of flow of electric current through a conductor.

Q—What is Voltage?

A—Voltage is similar to pressure. If you were measuring water

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flowing through a pipe, the quantity of flow would be measured in gallons per unit of time and the amount flowing would depend on the pressure. In electrical work the ampere is similar to the gallon and the voltage is similar to the pressure.

Q—What is a Watt?

A—The watt is a measure of work and can be translated into heat units or horsepower. 746 watts is equal to one horsepower. Translated to heat units, 1000 watts flowing for one hour or 1 kwh is equal to 3413 Btu. The watt in d-c calculations is equal to the product of amperes times volts.

Q—What is a kilowatt?

A—The kilowatt is 1000 watts.

Q—How many kilowatts equal 1 hp?

A—If 746 watts equal 1 horsepower then 746 divided by 1000 or .746 kw equals one horsepower.

Q—What is Ohm's Law?

A—Ohm's Law states that the amount of current flowing (Amperes) through a circuit is directly proportional to the electromotive force or voltage and inversely proportional to the resistance of the circuit. This is expressed by $I = E/R$. Where I equals amperes, E equals voltage, R equals resistance.

The accompanying table lists the important formulas in electrical work.

Q—What is power factor?

A—Power factor is the name given to the ratio between the apparent power and the actual or useful power.

Q—What is apparent power?

A—The apparent power is the power which flows and is indicated on the ammeter. The ammeter indicates all of the current flowing in a line, but all of this current cannot be used since there are losses in all electrical machinery. These losses are due to magnetizing current required, heat losses, windage losses, etc. Induction motors partially loaded have larger per cent losses and lower power

factor than when fully loaded.

Q—What is actual or useful power?

A—This is almost self-explanatory since the power actually used is the useful power.

Q—Why is power factor so important?

A—Poor power factor causes a reduction in the capacity of generators, reduces capacity of transformers, and causes poorer regulation of transformers. Poor PF increases line losses and lowers the voltage at the usage end of the distribution line. Low PF results in overheating of motors and lower speed of induction motors.

Q—What is meant by kva?

A—Kva means kilovolt amperes or thousand volt amperes since kilo means thousand. A 30 kva generator will produce 30,000 volt-amperes, which, when multiplied by the PF, will give you the number of kw.

Q—What is the difference between kilovolt-ampere and kw?

A—Kilovolt-ampere rating is the rating of the machine at unity or 100 per cent power factor. Kilowatts is the product of kilovolt-amperes and power factor.

Q—If a generator or alternator is rated 5000 kw at .8 PF, what would be the kva rating?

A—The kva rating would be equal to 5000 divided by .8 or 6250 kva. The tendency today is to rate a generator in kva and not bother too much with the kw rating.

Q—Why is it best to rate a generator in kva instead of kw?

A—Kw or kilowatt output of a generator depends upon the power-factor of the system. Kva or kilovolt amperes is the actual measure of the productive capacity regardless of power factor. The generator is capable of producing a given number of kilovolt amperes of power. If the power factor is unity or near unity the kw that can be produced will be equal or nearly equal to the kva rating. If the power factor is down then the kw capacity of the machine will be down.

Q—What must be done to synchronize two a-c generators that are to operate in parallel?

A—To synchronize two a-c generators the voltage on both machines must be the same and the frequency must be the same and they must be synchronized when they are in phase. Phase rotation must also be the same. This is usually checked when the machines are installed, and will not change unless the connections are changed.

Q—How do you know when the frequency of the machine you are synchronizing is the same as the frequency of the machine that is running?

A—The synchroscope will tell you or a frequency meter may be used to compare the two. A synchroscope is all that is necessary since the indicating hand will show whether the machine is too slow or too fast.

Q—How do you know when the two machines are in phase?

A—The synchroscope will again answer this. When the synchroscope hand is exactly straight up the machines are in synchronism.

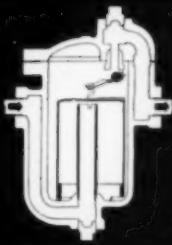
Q—When synchronizing, should you close the breaker when the hand of the synchroscope is at 12 o'clock, 11 o'clock, or 1 o'clock?

A—When synchronizing, the exact moment of closing the breaker will depend upon the type of breaker being used. If a mechanical manual type is being used, the breaker can be closed at 12 o'clock. This is the ideal time. If a solenoid operated breaker, motor or air operated breaker is used, then the time allowed for actual breaker closing must be varied according to the time delay required between the time the closing mechanism is actuated and the breaker actually closes.

Q—Is resistance added to or subtracted from the circuit to increase the voltage?

A—If you remember Ohm's law it can easily be seen that voltage increases as resistance decreases and voltage decreases when resistance increases. The formula may

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1. When trap is installed, inverted bucket is down and valve is wide open.



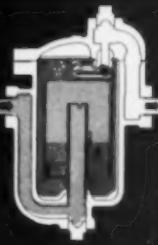
Side inlet
—side outlet
body style



2. When steam is turned on, condensate (solid color) flows into trap and orifice, until . . .

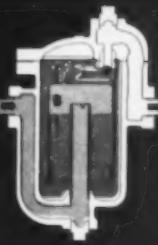


Bottom inlet
—top outlet
body style

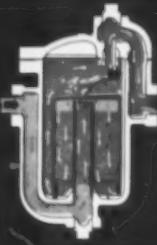


3. . . steam (light color) reaching the trap floats the inverted bucket and closes the valve.

SELF-SCRUBBING ACTION (See Fig. 2 above). Note that condensate first flows down between bottom of bucket and trap body, then up and out through orifice. The high velocity flow under bottom of bucket keeps dirt in suspension, washes it out when trap opens. No dirt problems with Armstrong design.



4. When more condensate enters, bucket loses buoyancy and pulls on valve lever.



5. When weight of bucket times leverage overcomes pressure on valve, trap opens.

BUCKET FLOATS WHEN LESS THAN 1/2 FULL OF STEAM (See Fig. 3 above). The generous margin of safety (dimension A in Fig. 3 above) insures that the bucket will float with trap body partly full of water. A heavier bucket would give more power but it might float and close the valve.

NO AIR BINDING (See Fig. 4 above). Air mixed with steam passes through the bucket vent, collects at top of trap and is discharged ahead of condensate. The large air-handling capacity of Armstrong traps insures top equipment temperatures and faster heat-up.

EXCESS POWER FOR OPENING (See Fig. 5 above). Armstrong design provides a generous safety margin. Reducing dimension B in Fig. 4 would increase power of bucket but margin between test opening pressure and operating pressure would be too low to allow for normal wear and pressure fluctuations.

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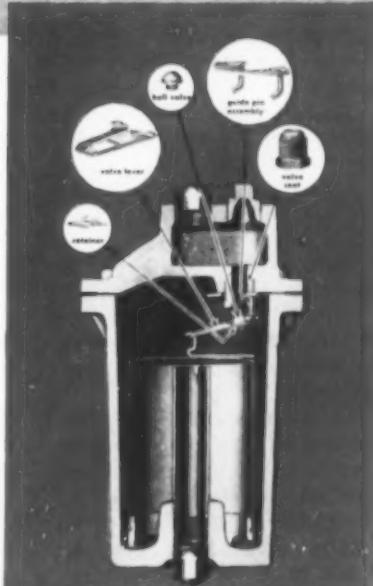
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Cross-section Armstrong inverted bucket bottom inlet-top outlet trap.

ARMSTRONG STEAM TRAPS

electric power questions & answers (continued)

also be written $RI = E$, or $R = E/I$, where I equals amperes, R equals resistance, and E is Electromotive force or Volts.

Q—What will happen if a circuit breaker is closed when synchronizing with the incoming machine out of phase?

A—If the machine being synchronized is not in phase with the machine operating, closing the breaker may cause the breaker to kick out on the other machine as well as the one being synchronized. This will kill the entire system. In some cases the breaker points may burn and fuse together which will result in very severe strains on the generator and prime mover. Incidents like this have caused turbine shafts to snap or spring; generator rotors to twist. In other words, coming in out of phase may wreck the generator and the prime mover.

Q—How can rotation be changed on a three phase motor?

A—By reconnecting two leads to opposite terminal connections.

Q—How can rotation be changed on single phase motors?

A—The windings must be changed.

Q—What should be used in cleaning motor windings?

A—A good quick-drying solvent which does not attack insulating materials and varnish should be used. Carbon Tetrachloride is a good solvent to use.

Q—If you were to select a starter for an induction motor, what type starter would you select?

A—In many places, it is required that all starters for motors of over 5 hp be of the reduced voltage type. In other localities across-the-line starters can be used up to certain hp higher than 5 hp but unless the local restrictions are known, it is a good idea to specify reduced voltage starters for all motors of over 5 hp. The type of starter specified will depend upon local regulations put out by the power company supplying the current.

Q—Will 25 cycle transformers work on a 60 cycle system if the voltage in and out is the same?

A—Yes, 25 cycle transformers can be operated on 60 cycles, but 60 cycle transformers cannot be operated on 25 cycles. When 25 cycle transformers are used on 60 cycle current, the exciting current and flux density will be only about .4 of the exciting current and flux density if the transformers were used on 25 cycle current. If, however, 60 cycle transformers are used on 25 cycle current the exciting current and flux density will be 2.4 times that of 60 cycle current.

Q—How can you improve low plant power factor?

A—By checking motor loads on motors and using motors of proper size to suit the load so that all motors are nearly loaded. Power factor can also be improved by installing capacitors, synchronous condensers, or using synchronous motors on some of the larger motor installations.

Q—What are capacitors?

A—Capacitors are built up of sheets of very thin aluminum foil which is used for the electrodes and sheets of very thin paper for separators between the foil. The paper is made from wood pulp or linen. Capacitors serve as condensers to level the peaks of current flow and cause current to lead the voltage or tend to lead. If capacitors only are in the circuit, the current will lead the voltage.

Q—What is a synchronous condenser?

A—It is very similar to a synchronous motor except that it does no work other than causing the current to lead the voltage. In sizes under 2000 kva capacitors are much cheaper. Operating cost of capacitors is much cheaper than the operating cost of a synchronous condenser.

Q—Is it cheaper to buy synchronous motors or induction motors and capacitors?

A—If for a new installation and power factor correction is needed

then it costs more to install induction motors, starters and capacitors to give power factor correction equal to that given by a synchronous motor of the same size and correction capacity in sizes of over 100 hp under 1800 rpm. In sizes under 100 hp, synchronous motors will cost more than induction motors of the same size and necessary equipment to give the same power factor correction.*

Q—How does the cost per reactive kilovolt-ampere of power factor correction of synchronous motors compare to the cost per reactive kilovolt-ampere of correction of capacitors?

A—Up to 150 hp in unity PF synchronous motors, and up to 100 hp in .8 PF synchronous motors in speeds below 1800 rpm the power factor correction from synchronous motors costs less per kva than it does in capacitors.*

Q—What is the ratio of kw to amps on a generator producing current at 2400 volts and .8 PF?

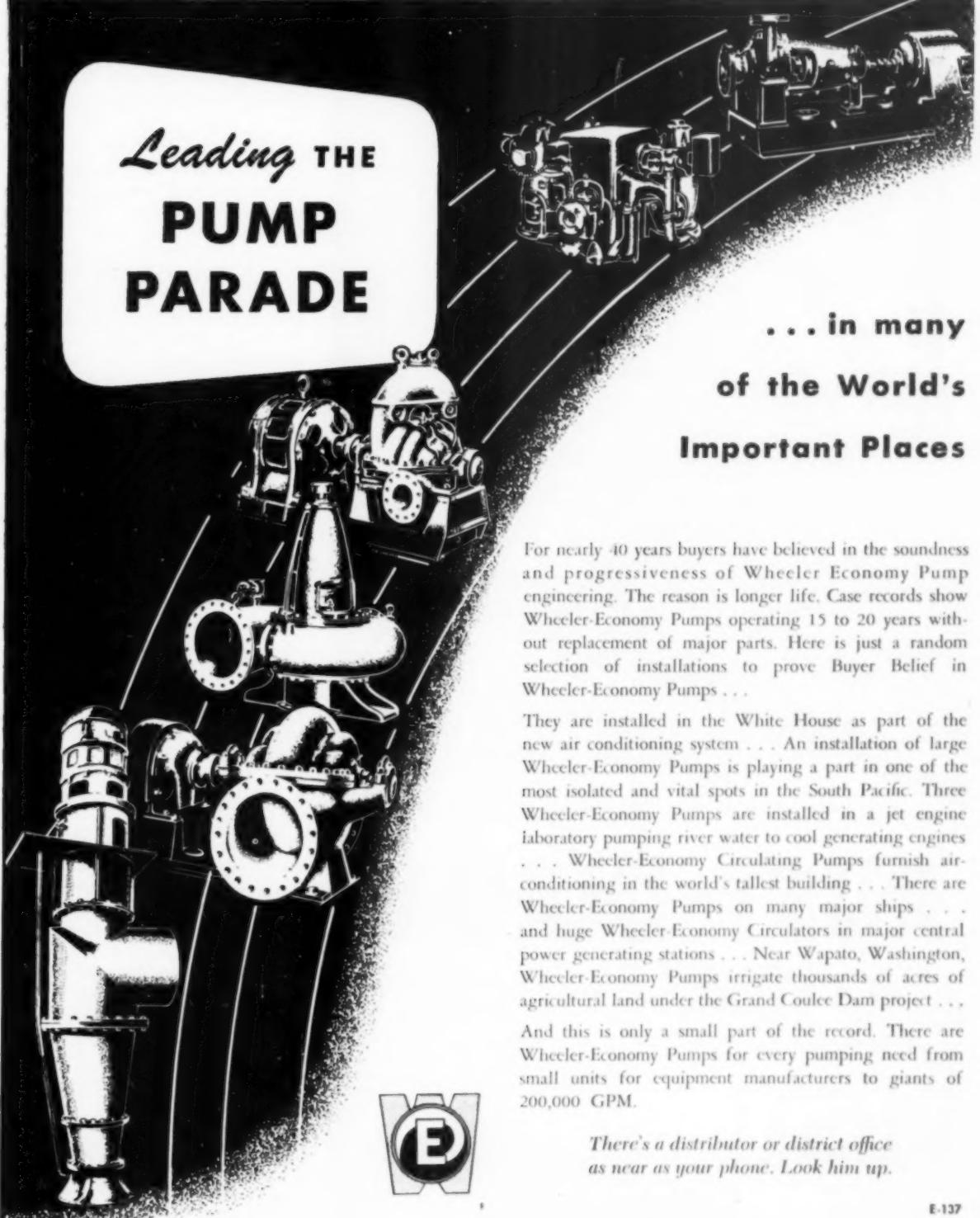
A—The ratio of kw to amps on a 2400 volt generator at .8 PF is roughly $3\frac{1}{3}$ to 1. Or the kw produced would be $3\frac{1}{3}$ times the amperes.

Q—What effect does power factor have on the amount of amperes on a generator?

A—If the generator is rated at .8 the amperes will increase beyond the name plate rating if the power factor is below .8 and decrease in proportion to load if the power factor is above .8. If the power factor were 100%, or unity, then the load limit on the generator would be the kva rating. If the power factor is below the nameplate rating then the amperage becomes the load limiting factor.

Q—What should the excitation voltage be in respect to the generator voltage?

A—There is no set ratio. The amount of excitation is varied as resistance is added to or taken out of the exciter circuit. The excitation voltage varies with amount of load carried, power factor, voltage changes on the generator and other conditions. The excitation voltage will increase as generator



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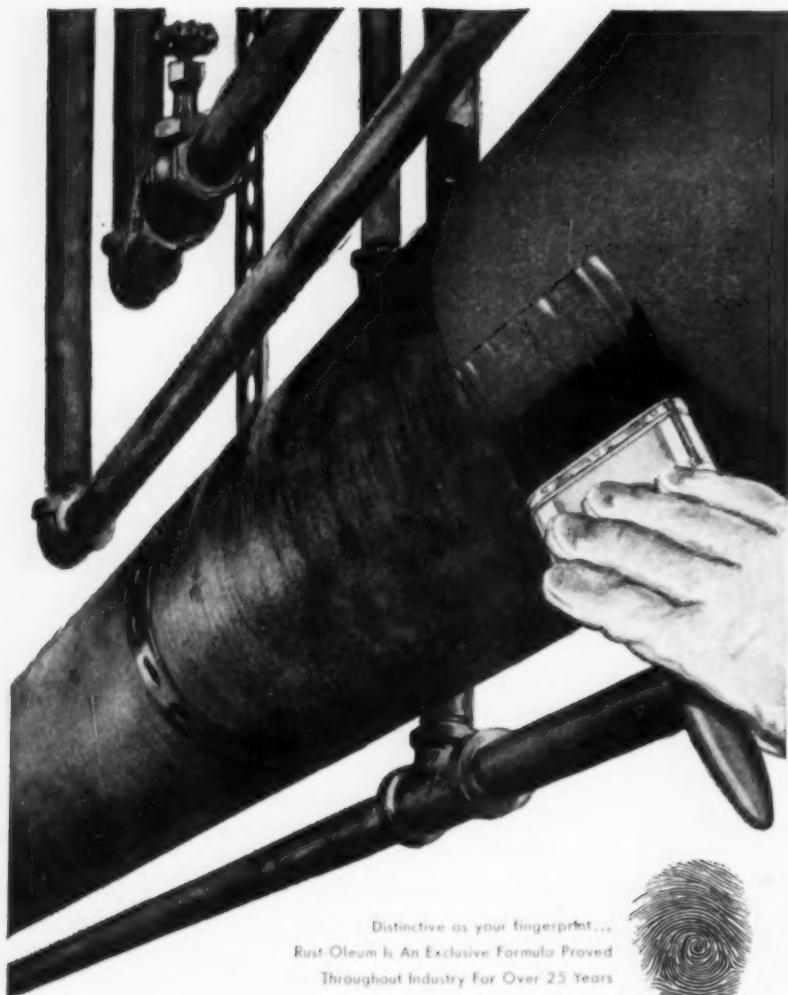
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electrical Q & A (continued)

voltage is increased and decrease as generator voltage is decreased. The exciter amperage will vary also.

Q—Will a generator handle more or less load at a frequency slightly less than design (60 cycles)?

A—A slight decrease in frequency will have no appreciable or noticeable effect on the load that a generator will carry. However, if the frequency should drop as much as 5 cycles then you would get a decrease in power factor and an increase in torque on all induction motors in the system.

Q—If 220 volt motors are operated at 230 volts, what happens?

A—When voltage is increased there is a decrease in power factor of the induction motors, an increase in torque, a decrease in slippage and slightly higher full load efficiency.

Q—If a 220 volt motor is operated at 200 volts, what is the effect on induction motors?

A—When voltage is decreased, the power factor of the motor increases, the torque decreases, the slip increases and there is a slightly lower full load efficiency.

Q—What is meant by slip when speaking of induction motors?

A—Slip is the difference between the synchronous speed and the actual operating speed of a motor at full load. For example: the synchronous speed of a motor may be 1800 rpm but the full load speed will only be 1740 or 1750 rpm. The difference is slip.

Q—Does a synchronous motor have slip?

A—No, a synchronous motor is tied in synchronism with the generator. Any slip will cause it to drop out or shut down. It will only vary speed slightly with an increase or decrease in frequency.

Q—What happens when one phase of a three phase transformer bank happens to become disconnected or is grounded?

A—On an ungrounded delta sys-

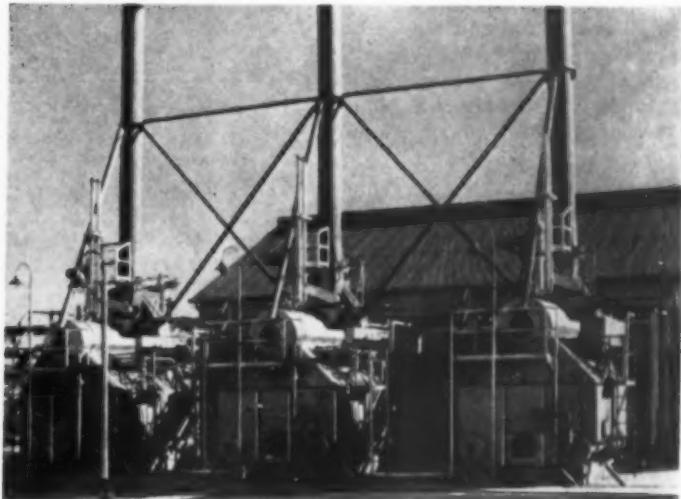
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tem, nothing happens; except the circuit operates as a grounded system or in open delta. But in case of the wye circuit, the entire circuit immediately goes dead, because the circuit breakers will drop out.

Q—Will a non-condensing turbine carry more load at a back pressure below design?

A—Yes, due to a decrease in back pressure, more expansion of the steam takes place and more power is developed. However, if the turbine is connected to a generator, the generator may limit the load and if the turbine is back pressure governed, the governor will allow less steam to flow through the turbine at a reduced back pressure or exhaust pressure.

Q—Can the frequency be changed on a system by speeding up one generator of the system?

A—Not unless the generator being speeded up has enough generating capacity to pick up the system load.

Q—What is the difference between lagging and leading power factor?

A—Power factor has already been explained as the ratio of apparent power to actual or useful power. There is another way of expressing power factor. It is the cosine of the angle by which the current either lags or leads the voltage. Alternating current flows in alternations or for each cycle, (or revolution of a 3600 rpm turbine), there are 360 electrical degrees. During $\frac{1}{4}$ cycle or 90 degrees the current and voltage increase to the maximum positive during the next $\frac{1}{4}$ cycle the current and voltage decrease to zero, during the next $\frac{1}{4}$ cycle the current and voltage increase to the maximum negative, and during the last $\frac{1}{4}$ cycle they both decrease to zero again. This rise and fall can be drawn or represented by the sine wave, but the sine wave of the current and the sine wave of the voltage seldom rise and fall exactly at the same time. The voltage may reach the maximum several electrical degrees before the current reaches the maximum. The cosine of this difference in electrical

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Amp when hp is known	$\frac{hp \times 746}{E \times \% \text{ Eff.}}$	$\frac{hp \times 746}{E \times \% \text{ Eff.} \times PF}$	$\frac{hp \times 746}{1.73 \times E \times \% \text{ Eff.} \times PF}$
Amp when kw is known	$\frac{kw \times 1000}{E}$	$\frac{kw \times 1000}{E \times PF}$	$\frac{kw \times 1000}{1.73 \times E \times PF}$
Amp when kva is known		$\frac{kva \times 1000}{E}$	$\frac{kva \times 1000}{1.73 \times E}$
Kilowatts	$\frac{I \times E}{1000}$	$\frac{I \times E \times PF}{1000}$	$\frac{I \times E \times 1.73 \times PF}{1000}$
Kva		$\frac{I \times E}{1000}$	$\frac{I \times E \times 1.73}{1000}$
Horserpower	$\frac{I \times E \times \% \text{ Eff.}}{746}$	$\frac{I \times E \times \% \text{ Eff.} \times PF}{746}$	$\frac{I \times E \times 1.73 \times \% \text{ Eff.} \times PF}{746}$

Where: I = amperes; E = volts; % Eff. = per cent efficiency; PF = power factor; kw = kilowatts; and kva = kilovolt-amperes.

cal degrees is the power factor lagging. Likewise, the current may lead or reach the maximum before the voltage by several degrees. The cosine of this difference would be the power factor leading.

Q—Is leading power factor better than lagging?

A—It doesn't make any difference whether power factor is leading or lagging. An 80% leading power factor means that the current is just as far out of phase with the voltage as it is at 80% lagging.

Q—What is unity power factor? Is it better than lagging or leading power factor?

A—Unity power factor is the best possible power factor. Unity power factor means that the current and voltage are exactly in phase.

Q—What is service factor of a motor?

A—Service factor means that the motor will carry load equal to the full load amperes times the service factor; and it also gives an indication of the class of insulation used in the motor.

Q—What are the classes of motor insulation and which is the best?

A—Motor insulation is classed as Class A, Class B, Class C, Class O; and Class H, which is a proposed classification for insulating materials that will withstand temperatures as high as 180 C or 356 F. The top limit, the maximum hot spot temperature for each of the other types follows: Class O—90 C, Class A—105 C, Class B—130 C, Class C material has no limit set as yet.

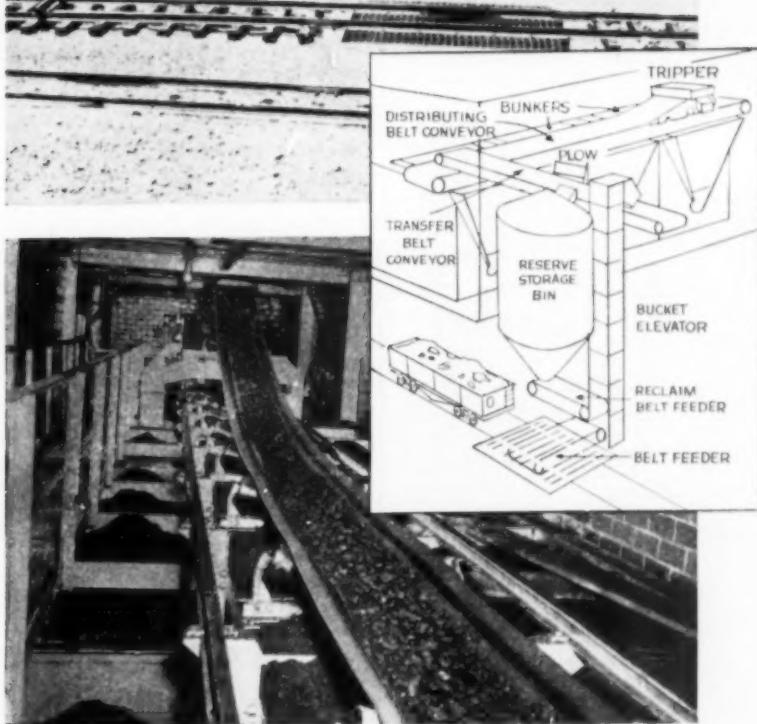
Q—If a motor nameplate states that the motor has a service factor of 1.15, what is the maximum safe operating amperage? What class of insulation is it likely to have?

A—The maximum safe operating amperes would be 1.15 times the full load amps as stated on the name plate. The insulation would probably be Class B and allowable temperature rise 50 degrees C.

Q—What information is found on a motor nameplate?

A—The motor nameplate will tell the manufacturer's name, kind of motor, the model number, the horsepower, the rpm at full load, the code, the type, frame number, serial number, voltage, amperes at given voltage and full load, frequency of current to be supplied, number of phases, and usually the

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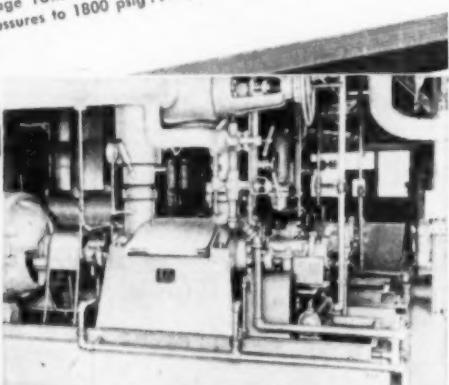
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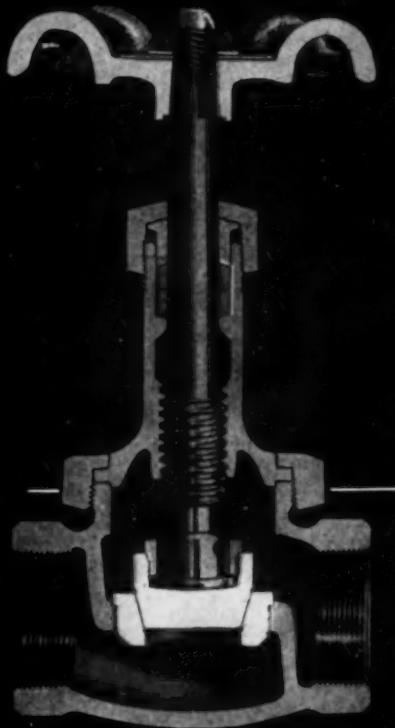
Q—What would happen if a generator exciter suddenly failed to deliver excitation current?

A—The generator would drop load immediately. If paralleled with other machines, these machines would have to pick up the load. The generator which dropped the load would motorize. The turbine would not be likely to overspeed, because the generator would be tied in electrically with the rest of the generators unless the circuit breaker would be provided with a reverse acting relay. In the latter event the generator circuit breaker would open and the prime mover might overspeed if the governor did not act rapidly enough to prevent it.

Q—Why is a reverse power relay necessary when industrial turbines are paralleled with a central utility power plant?

A—A reverse power relay serves to open the circuit breaker when the flow of power reverses. This is a definite advantage when buying power since the power company meters will usually only meter current flowing in one direction. When the turbines of an industrial plant generate more current than is being used in the plant, this current would flow to the power company lines unless prevented by a reverse acting relay or the operator pulled the breaker. If the operator were busy at some point where he did not notice the reversal of flow then all the current would go to the power company free of charge. Also in case the power company's breaker at the substation opened but the plant breaker did not open, the industrial plant generators would pick up the electrical load on the circuit from which they receive their power.

* In these answers note that the speeds quoted are low speeds for induction motors and slow speed synchronous motors are cheaper than slow speed induction motors. The induction motor comes into its own at 1800 rpm. Many things must be considered in questions of this kind. Must the drive be direct connected? If not, a higher speed induction motor belt driving the machine may be cheaper with capacitors than the synchronous motors. Space requirements must be considered. Initial cost, operating cost, space, and maintenance all have a bearing on selection of the proper combination for power and power factor correction.



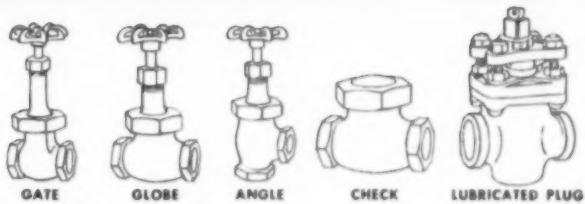
BRONZE

COMPLETE LINES OF BRONZE VALVES AND PIPE FITTINGS are manufactured by Walworth in a variety of types, pressure ratings, sizes, and patterns, including Walseal® Bronze Valves and Fittings for making Silbraz® joints.

Walworth also manufactures complete lines of valves and fittings — including Lubricated Plug Valves — made of steel, iron, and special alloys as well as bronze.

Walworth-made valves, pipe fittings, and pipe wrenches, total approximately 50,000 items—all sold through distributors in principal centers throughout the world.

Walworth engineers will be glad to help you with your problems. For full information call your local Walworth distributor, nearest Walworth sales office, or write to Walworth Company, General Offices, 60 East 42nd Street, New York 17, N. Y.



Bronze valves in gate, globe, angle, check, and lubricated plug types are manufactured by Walworth. Illustrated is a sectional view of a Walworth No. 225P Bronze Globe Valve. This valve has a working steam pressure rating of 350 psi at 550F (1,000 psi non-shock cold water, oil, and gas pressure). It features a renewable, plug type, stainless steel seat and disc, heat treated to 500 Brinell hardness.

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Manufacturers since 1842

valves... pipe fittings... pipe wrenches

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DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

**Bulk material handled
by flexible equipment
in Texarkana plant**

The Barber-Greene belt conveyor, feeding superphosphate to storage building, is housed for weather protection.



BELT CONVEYORS Solve Stockpile Control Problem

IN Texarkana, Arkansas, the International Minerals & Chemical Corporation, a leading manufacturer of phosphate fertilizers, was faced with the problem of reconstructing the major portion of a fire damaged plant. Prior to the destruction of the buildings and equipment by fire, the movement of bulk materials was accomplished by dump cars, front end loaders and push cars. This unit handling was expensive and created problems in

Dump cars, front end loaders and push cars outmoded. Conveying system minimizes hand labor and eliminates equipment and vehicle problems.

the control of stockpiles for storage and curing.

The Barber-Greene Company cooperated with the engineering department of International Minerals

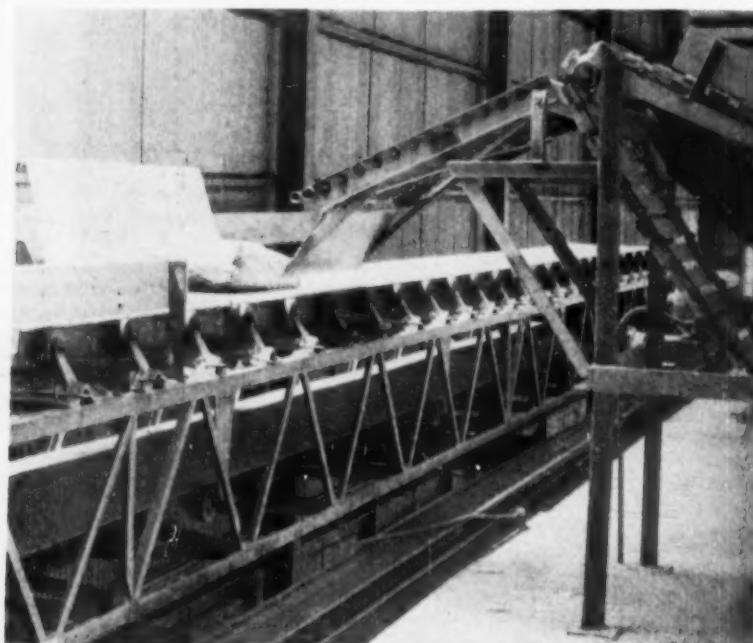
& Chemical Corporation in the development of a complete conveyor system. Barber-Greene permanent, shuttle and portable conveyors were planned to handle the raw materials, materials in process and finished products. The physical characteristics of the materials proved to be in nearly all cases suitable for belt conveyor handling.

Process Data

Florida pulverized rock phosphate is received in railroad cars and unloaded into storage or into the acidulating process. The rock phosphate is combined with sulphuric acid, the two being in about equal

After the final curing period, fertilizer is carried in indoor tractors to the bagging department. Bagged material is handled by a combination of slot and roller conveyors to a shuttle conveyor. The B-G shuttle conveyor is readily moved to any location on the loading platform.

A Barber-Greene self-propelled conveyor, mounted on four caster wheels, is placed to load from the shuttle conveyor and discharge directly into the truck. This arrangement provides for continuous handling from the bagging machine to the truck with minimum labor requirements.



Something New... Something Bigger!

IN A SINGLE PACKAGE

COMBUSTION CONTROL

From steam flow—air flow, or by the fuel air ratio method. Designed especially for the most modern central station boilers, but well suited for smaller units.

FEED WATER CONTROL

From three, two or one influences. Instrument or mechanical types to meet all operating conditions or preferences. Adaptable to all piping layouts.

STEAM TEMPERATURE CONTROL

Multi-element type. Through burner or damper positioning, gas recirculating,

direct cooling-water spray or heat exchanger.

SOOT BLOWER CONTROL

May be full automatic-sequential control or individual push buttons. Each step in the blowing cycle can be reported back to the panel by signal or program lights.

MINIATURE OR STANDARD INSTRUMENTS BY Taylor

Miniature instruments, especially with auto-manual selector valves, are ideal for modern space-saving and graphic panels. Standard size instruments also available.

COPES-VULCAN DIVISION, CONTINENTAL FOUNDRY & MACHINE COMPANY, ERIE, PA.

ASK FOR BULLETIN 1007



BOILER CONTROLS

proportions by weight. Scales are used for accurately weighing the acid and rock. The weighed acid and pulverized rock are put into a pan or "wet mix," where they are thoroughly mixed in batches weighing from 1 to 2 tons each. Then the batch is discharged into a box-like chamber called a Mechanical Den, where it is allowed to set and the evolution of gas to subside. After the superphosphate has hardened or "set," it is dug out of the Den by mechanical means. The superphosphate is then fed on a belt conveyor to a storage building.

Superphosphate is distributed into storage on a shuttle conveyor or discharged onto two additional Barber-Greene conveyors, which carry it to a second storage building. Shuttle conveyor, on rails under the monitor top, permits superphosphate to be dumped at any desired point along the length of the building.

After 6 to 8 weeks of curing, it is ready for final mixing. From the mixer, the fertilizer goes through a rotary cooler and is distributed to storage bins by other B-G conveyors, feeding a series of shuttle conveyors mounted over the bins. Stockpiling sections in the entire area can be pin-pointed for discharge by the conveyor.

In the storage building, the superphosphate is distributed into storage on a shuttle conveyor or discharged onto two additional conveyors which carry the superphosphate to a second storage building. The shuttle conveyors furnish close control of stockpiling.

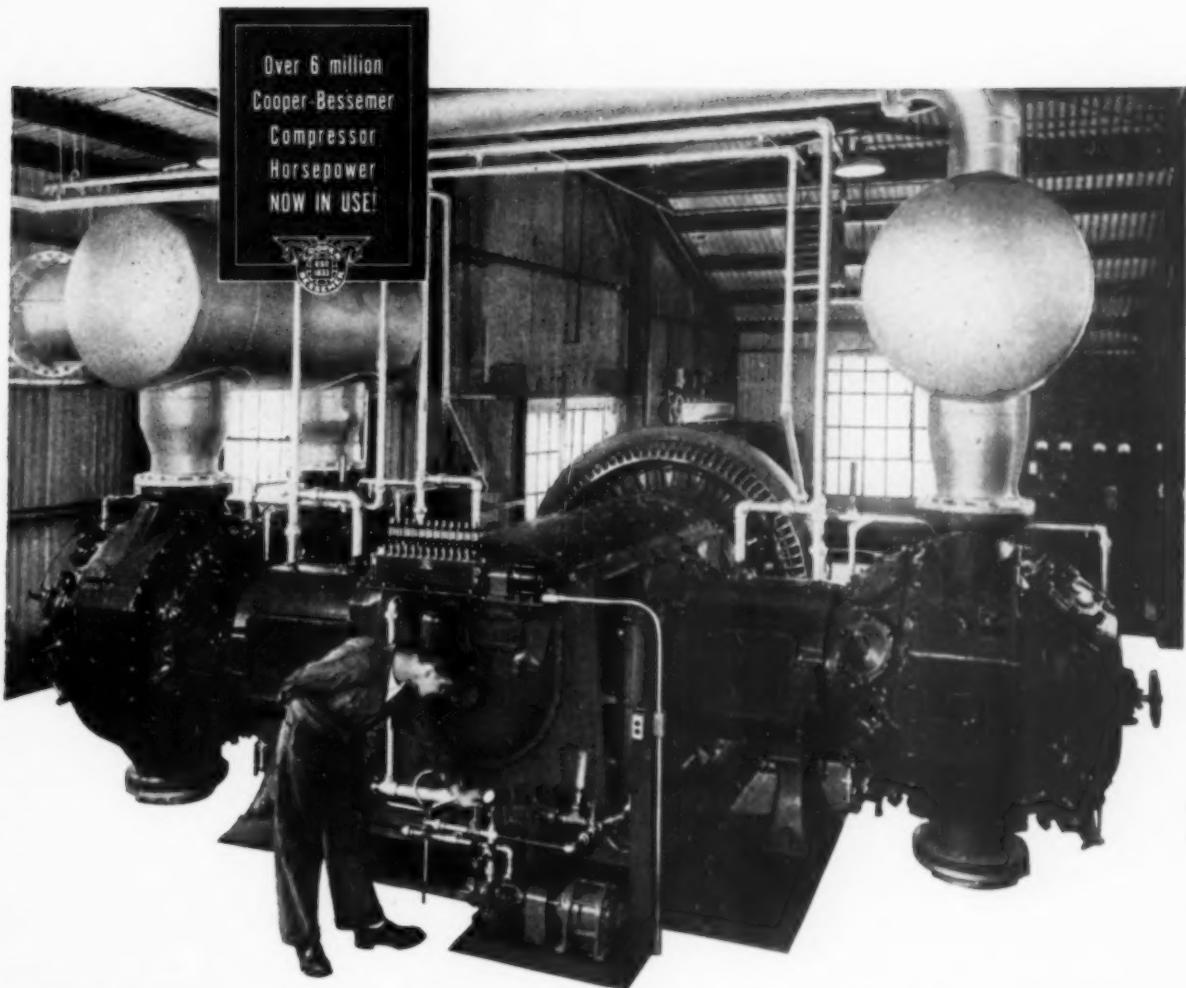
After approximately 6 to 8 weeks of curing, the superphosphate is ready for final mixing. The material is combined with additional materials in a special 8 compartment batch-weighing unit in the "basing mill." From this unit it is conveyed to a mixer, where a nitrogen

solution is added. From this mixer the fertilizer goes through a rotary cooler and is distributed to storage bins by other conveyors, feeding a series of shuttle conveyors mounted over the bins.

After a final curing period, the fertilizer is carried in indoor tractors to the bagging department. The bagged material is handled by a combination of slat and roller conveyors to a shuttle conveyor. The shuttle conveyor is readily moved to any location on the loading platform.

(Continued on page 88)





FOR PFIZER ANTIBIOTICS . . . the "healthiest" of compressors

AT Chas. Pfizer & Co., Inc., Vigo plant in Terre Haute, antibiotic processing is a continuous operation, requiring lots of air. And since air failure would be disastrous, it was essential to have the most reliable compressor obtainable. The Cooper-Bessemer unit shown above was installed over a year ago; has been in virtually constant 24-hour-a-day operation ever since.

There's all kinds of proof that you can't top a Cooper-Bessemer compressor for reliability. What's more, its modern, compact design, with vibration-free opposed action, means smoothest operation, simplified maintenance, and substantial savings in space and foundation requirements.

Send for the latest bulletin, shown here, or check with the nearest Cooper-Bessemer office on the money-saving unit just right for your needs.

SEND FOR YOUR COPY

Covers Cooper-Bessemer Type M compressors, 200 to 1000 hp. Other bulletins covering still larger size units are also yours for the asking.



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The Outlook for Atomic Power

As a potential source of vast amounts of cheap power, atomic energy is subject to fundamental limitations.

Material has been adapted from the third edition of the General Electric Company's Atomic Energy Fact Sheet, summarizing the work of the company to date in the field of atomic energy.

The Atomic Energy Commission's Fourth Semi-Annual report, issued in 1948, stated that it seemed impossible, even "under the most favorable circumstances, to have any considerable portion of the present power supply of the world replaced by nuclear fuel before the expiration of 20 years."

Nothing has developed since then which would shorten this estimate materially; in fact, the statement still seems quite optimistic. The development of atomic power will be gradual, over a long period of time, and will be evolutionary rather than revolutionary. It may also be profoundly affected by military demands for nuclear fuel as a material for atomic bombs. In any case, it seems at present that atomic energy will only supplement, and not supplant, present sources of power.

NO PRACTICAL method is now known or contemplated for converting atomic energy directly to electricity, according to recent comments of General Electric Company engineers. Ultimately, considerable amounts of our power may be produced atomically but, in the foreseeable future, it seems certain that any such production will be subject to some fundamental limitations.

The energy released from the split-

ting atom would appear as heat, which could then be carried by a liquid or a gas to a heat exchanger, or boiler, where steam would be generated. The steam would then drive a steam turbine-generator to produce electricity.

Thus, in an atomic power plant, the atomic reactor and some auxiliary equipment, including the heat exchanger, would merely replace a fuel-fired steam boiler. From that point on

Belt Conveyors Solve Stockpile Control Problem in Texarkana, Arkansas, Plant

(Plant applicational data starts on page 84)

A self-propelled conveyor, mounted on four caster wheels, is placed to load from the shuttle conveyor and discharge directly into the truck. This arrangement provides for continuous handling from the bagging machine to the truck with minimum labor requirements.

System Benefits

The flexibility of the system permits diversion of material flow for storage or sale at any point in the material processing flow. Raw materials can also be introduced into

the process direct from railroad cars by the conveyors.

The B-G system has resulted in increased efficiency by minimizing hand labor, unit equipment and vehicle problems in the plant. Accurate control of stockpiles is afforded by the shuttle conveyors. Operating expenses are reduced by the increased efficiency and accurate control of materials.

Since this successful application, the company has incorporated similar systems in several of its fertilizer plants.

the atomic plant will be essentially the same as one burning coal or oil as a fuel.

What About Costs?

Consequently, it seems that the first cost of an atomic power plant will be at least as high as that of a fuel-fired plant under normal conditions. It is believed to be entirely possible that the cost of nuclear fuel may eventually become competitive with that of coal or oil. At present no reliable estimate of its cost can be given, for there are so many factors concerning which we do not have the knowledge and experience to evaluate properly.

In areas where electricity is now readily available, at reasonable cost, it is hardly likely that the advent of atomic energy will cause any revolutionary reduction in the cost of power. Of the total price now paid by the consumer for fuel-generated power, only 20-25 per cent goes to pay for the fuel itself. Hence, even free nuclear fuel would cause a reduction in power costs of only 20-25 per cent. While this would be significant, it is hardly in keeping with some of the more fanciful pictures that have been drawn as to the effects of atomic energy.

The great advantage of atomic fuel is that it is so concentrated a source of energy. This makes it seem quite likely that atomic energy may bring economical electric power to areas where the transportation costs on conventional fuels are extremely high.

Large Plants Needed

This does not, however, mean that small atomic power plants will spring up in every isolated area. An atomic power plant will necessarily be of large capacity, perhaps a hundred thousand kilowatts or more. In addition, to reclaim the potential energy remaining in the partially used fuel, a large supporting chemical plant may have to be associated with the power plant.

In other power applications, the requirement of a radiation shield around the atomic reactor is a serious restriction. In the light of present knowledge, such a shield would weigh many tons, far beyond what a truck or automobile could carry. Possibly it could be built within the confines of a locomotive, which would then be capable of running for a very long time without refueling. The same is true for an airplane. A ship could easily carry an atomic plant, as far as weight and space are concerned. That is why it seems likely that the first major application of atomic power, in a unit specifically designed for its purpose, will probably be for ship propulsion.

Jenny doesn't live here any more!



YES, in the modern coal mine there's no room for Jenny. Today her job is done by powerful electric locomotives capable of pulling 50 times the load Jenny used to haul to the mine surface.

As a matter of fact, in the modern mine even the traditional pick and shovel are as out-of-place as Jenny herself! More than 90% of *bituminous* coal is now mechanically cut, and over 70% is mechanically loaded. Result: more economical coal to light the way, fuel the fires, power the progress of America.

But, basically, what caused Jenny to disappear? What's behind American industry's ever-more efficient machines that turn out goods at lower cost—thus making them available to more people? One word tells the story—**COMPETITION**.

In the coal industry there are 5,000 privately managed coal companies competing with one another and all competing in the market with other fuels. When one coal company develops more efficient mining methods, the rest can keep pace only by striving to improve even further. No won-

der that with his modern machines, developed through competition, the American miner's daily output is 4 to 24 times that of any miner in Europe or Asia—most of whom work in government-controlled coal industries.

Just as competition spurs you on to trying harder—it's competition that goads the individual company to deliver products that will outsell others. And it's competition that keeps a whole industry on its toes, cutting distribution costs, opening up new outlets, and delivering better products.

Competition—not government control—has already made America the most productive nation on earth. Competition—not regimentation—points the way to ever greater plenty for all of us.

★ ★ ★

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THE COMPETITIVE SYSTEM DELIVERS THE MOST TO THE GREATEST NUMBER OF PEOPLE

SOUTHERN POWER & INDUSTRY for JANUARY, 1953



HELPING the **MAN-IN-THE-PLANT** *ideas . . . tools . . . methods . . . devices*

KEEP POSTED—Operating Aids for Your Reference File

Selecting Unit Heater Traps?—How to figure condensing rates, how to select unit heater traps and hints on unit heater trapping are featured in Bulletin No. 231 of the Armstrong Machine works. The Btu output ratings for various models of 30 different makes of unit heaters are listed in the new 8-page bulletin.

Included are tables for selecting traps for constant pressure and various pressure operation and a table of constants for determining output of unit heaters at other than standard steam pressures and entering air temperatures. Special chart determines heater outputs at various fan speeds. For your free copy, circle item number B-10 on the page 17 reader service coupon post card.

Hook - On Instruments — volt - ammeters, wattmeters, and power-factor

meters, can improve voltage regulation, reduce needless heating and lower power bills. General Electric's new 8-page two-color bulletin GEC-901, available to you by circling item number B-11 on the page 17 post card, contains applications, operation, and basic features of the company's complete line of hook-on instruments.

Servicing Rotary Pumps?—Installation, operation and maintenance of rotary pump are covered in Warren Steam Pump Company's new 12-page service manual. Installing foundation bolts, alignment, supporting vertical pumps, grouting, piping, suction lines, hot liquid pumps, rotation, packing, dismantling, reassembly, starting, operation and standing idle are subjects featured. For your copy, circle number B-12 on the page 17 reader service coupon post card.

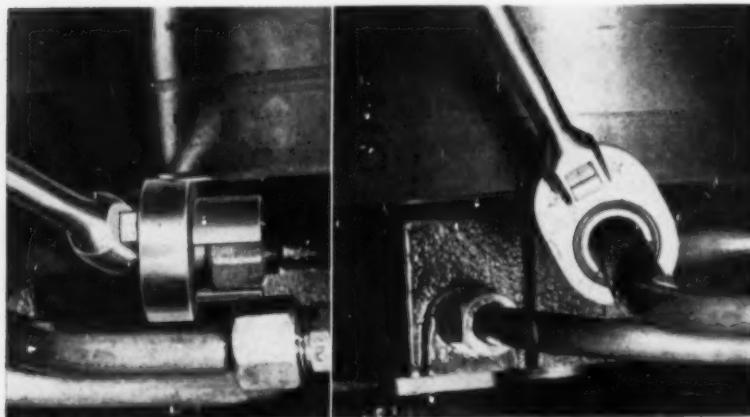
Conveyor Belt Failures?—Ply separation, carcass deterioration, irregular plies, edge wear, and longitudinal seam failure are some of the items covered in Barber-Greene Company's 8-page Conveyor Belting Bulletin. Belt selection tips are also given. For your copy circle item number B-13 on page 17.

Up - to - Date Industrial Lighting Standards are featured in the new 44-page "RLM Standards Specifications Book." Detailed specifications for 18 of the most commonly-employed incandescent and fluorescent industrial lighting units are tabulated. New specifications noted are high-mounting units for high-bay industrial installations and high-mounting aluminum reflectors. Wherever applicable, a light distribution curve and coefficients of utilization table have been included. Circle item number B-14 on the page 17 coupon post card for your complimentary copy.

For Those Difficult Wrenching Jobs

UTILIZING this open ended, ratcheting socket wrench, the plant maintenance man can cut op-

erating time considerably on those hard-to-reach jobs. The design, by Tubing Appliance Company, Los

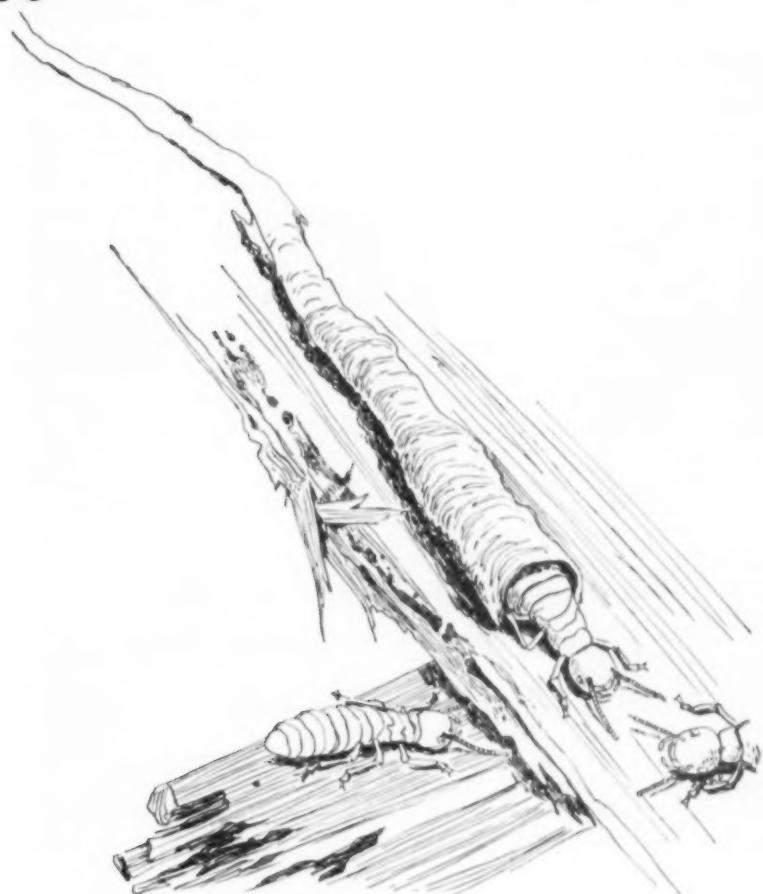


Angeles, permits the introduction from any side of the socket over and completely around a pipe or tube and straight down on the fitting. There the socket engages nut or bolt and ratchets it off or on.

Engaging fittings by "surrounding" the tube, pipe, conduit, cable, etc., the wrench head ratchets by means of internal pawls. These act upon teeth cut into a ring which travels in a circular channel around the wrench head. As little as 7° clearance for the regulation square drive handle will permit normal functioning.

TAC's open end ratcheting socket wrench permits introduction from any side of the socket over and around a pipe or tube and straight down on the fitting. There the socket engages nut or bolt and ratchets it off or on as fast as the arm can swing. For additional data, check page 10, SP&I for December '52.

tubing...



Blind from birth, termites, the industrious scavengers of the forests, often build their own peculiar tubing in order to reach a wooden structure.

Pipe and Tubular Products fabricates tubing, too, but for vastly different purposes: condenser tubes, boiler tubes, tubing for superheaters as well as welded tubing and structural fabrication. And our new, larger plant at Catasauqua, Pa., means greater variety of service to our customers, widens horizons for our clients.

Our facilities for the fabrication and bending of piping and tubing are bigger than ever before—50,000 square feet. With these added facilities, we've been shipping more orders in less time . . . orders for tubing for many things from bicycle frames to bus exhausts, tubular parts for trucks and tractors, motors and machinery, frames and fuel lines . . . the list is long and varied. We bend all kinds of tubes to different shapes for many purposes.

Service, however, remains paramount with us. An extremely large warehouse stock of resistance-welded and seamless tubing from $1/2"$ to 5" OD means no waiting for mill delivery. On emergency repair jobs, shipments are made the same day the order is received.

Why not take advantage today of highly-skilled workers, a specialized experience of many years in this field, and extra-fast delivery by a big fleet of trucks? Unlike the termites, we have our eyes wide open . . . especially when it comes to fast, dependable service.

PIPE & TUBULAR PRODUCTS

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Tubing  *Specialists*

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PLANT: CATASAUQUA, PENNSYLVANIA

tubing and piping • warehousing and fabricating • engineering and machining

helping the man-in-the-plant (continued)

Plant Finds Cure for Hazardous Floors

PLAGUED by a long record of accidents caused by slipping and falling on grease and oil-stained floors, a Southwestern publisher determined on corrective action.

Beside the accident hazard, maintenance costs were alarmingly high. Plant maintenance personnel never succeeded in keeping the floors clean. More grease, oil and ink seeped into them daily. Though more hours of labor were charged against floor upkeep, the floors continued to look soiled and frequent floor repair was necessary.

To remedy this, it was decided

to test various types of flooring in several plant areas where traffic was high and grease and oil spillage most frequent. For 6 months, careful records were kept pertaining to accidents, durability, maintenance and repair costs of floor materials tested.

Plant management also consulted the National Bureau of Standards which provided results of tests which showed the anti-slip qualities of flooring materials suitable for plant use.

As a result of these investigations, greaseproof Kentile was se-

lected. Plant tests showed that it was most efficient of the materials tested because it was designed especially for plants where grease oil and ink are present. These substances did not cause any cracking or deterioration to the flooring.

Due to its high asbestos content, this flooring is highly fire-resistant, which helps to hold liability insurance rates at a lower level.

Plant tests showed maintenance cost to be extremely low. Washing with a mild soap and light waxing keeps the floor in top condition.

In case of damage due to abnormal flooring load, only the damaged tile need be replaced. This is done easily and quickly by the plant maintenance staff without disturbing the plant operation or the rest of the floor. Tile can be walked on immediately after laying.

Flat Leather Belts Give Excellent Service for Wide Horsepower Range

By FRANCIS A. WESTBROOK

DURING recent modernization work, E. L. Hoffpauir, Superintendent of the Supreme Rice Mill in Crowley, Louisiana, improved the drives of many production machines by mounting the motors on tension control bases and using flat leather belts for power transmission. Majority of the drives have very short distances between centers and many have large speed reductions.

Note the 7½ hp., 1800 rpm.

squirrel cage induction motor (Wagner) driving a Phelps dust collecting fan—(1). It is mounted on an automatic tension control base with a driving pulley 6 in. in diameter and 7 in. face. Both driving and driven pulleys are flat and fiber type, with a distance between centers of 30 in. Transmission is a 6 in. wide, double ply, Royal Crome endless leather belt. Operation is continuous 24 hours a day, 6 days a

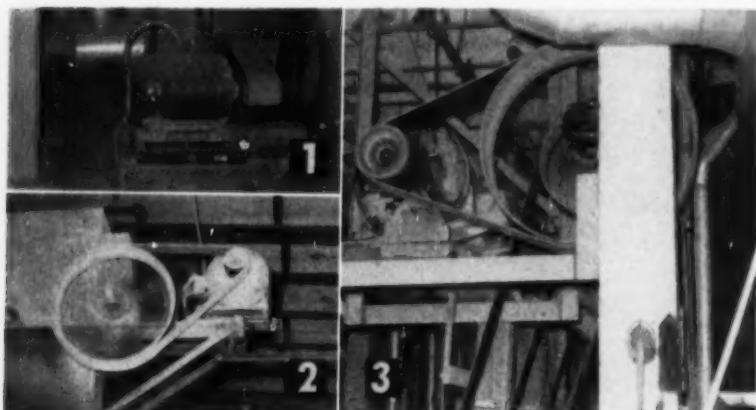
week. This is a very dusty location but wear and power consumption are much less than with the drive formerly used.

The elevator drive (2) consists of a 2 hp., 1800 rpm., squirrel cage induction motor (Wagner) on a Rockwood tension control base with a very large speed reduction and short center distance. A single ply, Royal Crome, 3 in., endless leather belt is used.

The 50 hp., 1800 rpm. Century constant speed squirrel cage motor (3) drives a battery of five Engelberg hullers. There is a big difference in the diameters of driving and driven pulleys and the short distance between their centers. The tension control mounting for the motor is an essential part of the drive. The endless leather belt is premium grade Royal Crome. Operation has been so satisfactory that the plant has standardized on this type of drive for all new machinery as well as conversion of existing drives. Economy in power consumption has resulted.

Properly engineered drives of this type give excellent service for a wide range of horsepower. These are Uni-Pull drives—a registered name used by the American Leather Belting Association to indicate short center flat leather belt tension controlled drives.

Photos courtesy Colossus Industries, Inc., Shreveport, La.



Duafuel Engine Cuts Fuel Cost

ONE 1200 hp Nordberg Duafuel engine in the Commerce, Texas, municipal power plant is producing electric power for a total fuel cost of 2.70 mills. This represents a reduction of more than 72 per cent in fuel costs, a savings of more than \$11,000 in the first six months of Duafuel operation.

The city first constructed a municipal power plant in 1929. Three Diesel engines with a total of 660 hp supplied the early power needs. In 1939, a 300 hp Diesel was added to the plant and in 1947 a 575 hp Diesel was installed.

To provide the additional capacity required and at the same time to take maximum advantage of available low cost natural gas it was decided to purchase a Duafuel engine large enough to carry the bulk of the load. Implementing this decision, the city installed in April, 1951, a Model FSG-138-SC Nordberg supercharged Duafuel engine. This eight cylinder unit has a 13" bore and 16½" stroke and develops its rated 1200 hp at 450 rpm. The engine operates on natural gas with a small quantity of pilot oil to initiate combustion.

The new engine quickly demonstrated its value to the plant after going into full service in May, 1951. After the first two months, the unit really hit its stride and was in operation 95 per cent of the time, producing a comparable percentage of plant output. This heavy schedule inevitably meant many hours of operation with light, unfavorable loads. Average operating load factor for the engine was only 50 per cent. Yet, it proved highly profitable to run the Duafuel engine even at relatively inefficient load levels rather than use the oil-burning engines.

During the six months under consideration, the entire plant used 55,289 gallons of fuel oil and 9,439,000 cubic feet of natural gas at a total cost of \$8,510.40. Fuel costs for the same number of kwh at the consumption rate prior to installation of the Duafuel would have been \$19,686.00—a saving of \$11,175.60.

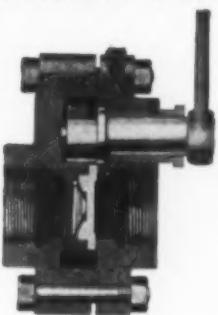
EVERLASTING VALVES

Mean "Everlasting" Protection on these duties



GENERAL SERVICE

Wherever frequent use and quick operation is required for any liquid or gas at pressures up to 300 psi. These valves have outside stuffing box and gland.



STEAM JACKETED

Assure continued free flow of any material which congeals at ordinary temperatures.



FIRE PROTECTION

Closing type for inflammable liquid emergency shut-off, or opening type for deluge or drainage, assuring immediate and positive action with weighted pendulum stop.



BOILER BLOW-OFF

Quick-opening, also hand-wheel operated. Angle and "Y" types and combination units meeting ASME Code requirements. For pressures up to 600 psi.



BOILER WATER COLUMN

With indicator and locking device. Meets ASME Code requirements.

EVERLASTING FEATURES

For more than 40 years, EVERLASTING VALVES have been known for their ingenious design, simple sturdy construction, and long trouble-free life with low maintenance expense. Some of their distinctive features are:

Quick-Action . . . opened or closed with less than a quarter turn of the operating lever.

Straight-Through Flow . . . the disc cannot become loose and accidentally check the flow.

Drop-Tight Seal . . . constant contact of disc and seat at all times prevents dirt or scale from getting between.

Self Regrinding . . . the disc rotates on the seat with each operation, thus regrinding the sealing surfaces.

No Wedge Action . . . all parts move between parallel faces.

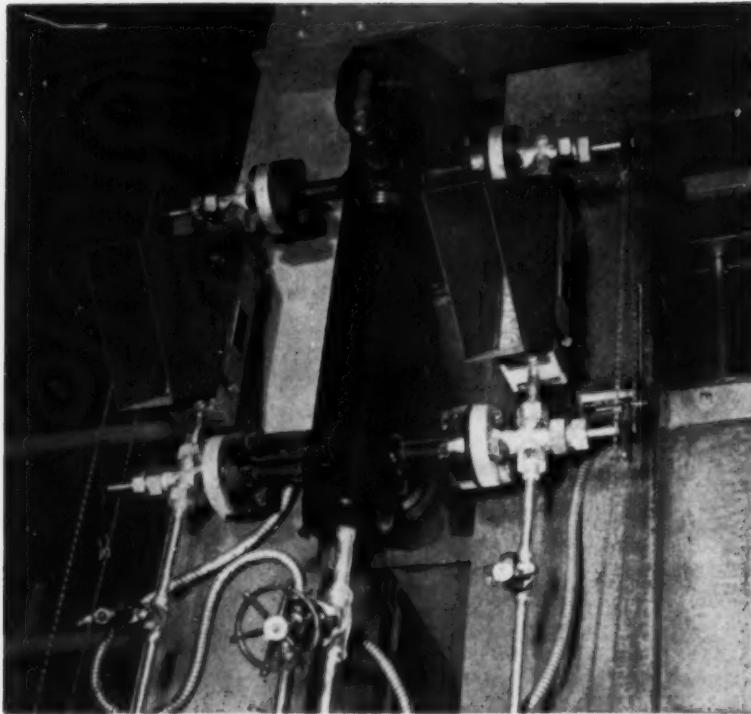
Write for bulletin describing EVERLASTING VALVES in detail.

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Help yourself to Better Water Level Supervision with Reliance Boiler Water Columns

Assure greater accuracy of gage readings . . .

Have safety warning by automatic alarms on pressures up to 900 lbs.

Reliance Boiler Water Columns have unusual ruggedness, safety features, and extra capacity well above their ratings. For pressures to 900 lbs., the Reliance high and low ALARM Water Columns provide a reliable warning signal. Sensitive to the slightest water level variation. Reliance Columns without alarms fill any requirement up to 2000 lbs., in standard models or special construction engineered to fit your needs. Specializing for 68 years, Reliance brings you the most complete service in approved devices for water level supervision—water gages for water column installations—direct-to-drum gages—remote reading gages—special alarms for boilers and auxiliary tanks. Check with your consultants or ask for our nearest representative.

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The name that introduced safety water columns....in 1884

Reliance®
BOILER SAFETY DEVICES

Painting Plant Improves Production

STEADILY mounting absenteeism and high turnover of personnel were causing the board of directors of a large South Carolina textile mill much concern. Faced with a serious drop in production, when an abnormally high number of employees were absent from work or lax in their work, it was decided to call in a firm of management consultants.

Investigation began by interviewing employees who failed to report for work and those who left their machines before quitting time. The experienced interviewers who visited employees in their homes reported that the absenteeism was due to (1) on-the-job fatigue; (2) headaches; (3) eyestrain.

Employees had been taking the required rest periods and a careful study of the plant's ventilating system showed that it was working properly. The management consultants, having thus eliminated two suspected causes, then recommended consulting a psychiatrist specializing in industrial problems.

More interviews were held and the employees were questioned along new lines. Finally the psychiatrist pointed out that the monotony of the work, the dull battleship gray of the walls and machinery, and the intense glare of the sunlight were all indicated as underlying causes of the trouble.

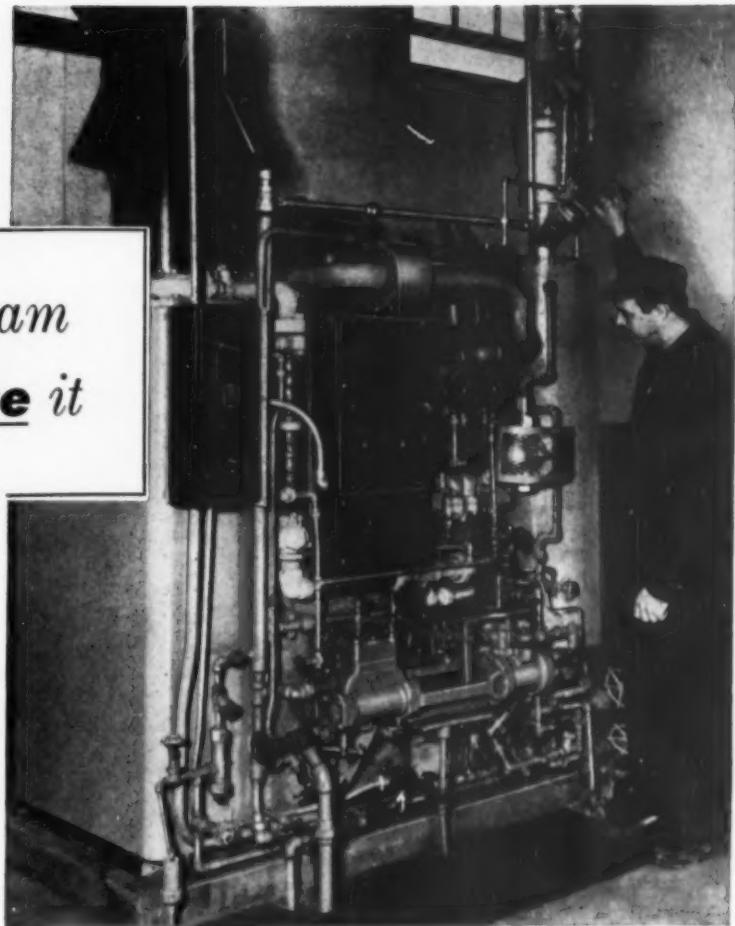
He explained that eye fatigue has adverse effects on all parts of the body. Eyes are constantly moving, and an effort is required every time the iris expands or contracts. Eye muscles tire just as other muscles do. But the fatigue does not stop with the eyes. One gets tired all over, has headaches, and develops nerve strain and digestive upset. The problem then was to relieve the cause of eye-fatigue. So, he suggested that a color expert be brought in.

Color Selection

A noted color consultant, affiliated with Colorizer Associates, manufacturers of the Colorizer

Make your steam
where you **use** it
with this . . .

PUSH-BUTTON STEAM PLANT



Just push the button — and in a matter of minutes the C-E Re-circulation Steam Generator will give you up to 6,000 pounds of steam per hour at up to 300 psi. That's just about all there is to it.

For the C-E Re-circulation Steam Generator is more than a package boiler — it is a fully integrated, fully automatic, steam plant complete with all controls and accessories, and it takes a minimum floor space . . . about the same as two office desks.

If you have a space 7 feet square by 8 feet high and you need steam for . . .

. . . remote spots not served by present steam lines, or involving long, wasteful pipe lines

. . . occasional loads that exceed the capacity of your present steam generating equipment

. . . highly fluctuating loads and those involving sudden heavy demands

. . . any conditions requiring maximum output from minimum space, with minimum attention.

If you do — or wherever you need a compact . . . reliable . . . automatic source of steam for heat or process — don't just buy a boiler — investigate the C-E Re-circulation Steam Generator. You'll find further details in bulletin p-323a. May we send you a copy?

IF COAL IS YOUR FUEL . . .

. . . investigate the C-E Skelly Stoker for best results with either bituminous or anthracite. A comprehensive catalog with an engineering section is yours for the asking.



COMBUSTION ENGINEERING — SUPERHEATER, INC.

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B-581A

ALL TYPES OF BOILERS, FURNACES, PULVERIZED FUEL SYSTEMS AND STOKERS; ALSO SUPERHEATERS, ECONOMIZERS AND AIR HEATERS

CUT PRODUCTION COSTS WITH DIXISTEEL FORGINGS AND STAMPINGS



COST-CONSCIOUS manufacturers and fabricators are using our modern facilities to keep the cost of manufacturing down and product quality up.

It will pay you to check into these facilities which offer:

Forgings and Stampings produced from high-quality DIXISTEEL—positive assurance of correct chemical and physical properties to meet your specifications.

Blanked and Formed Parts produced on the latest type presses, ranging in capacity up to 250 tons.

Closed-die Forgings up to 20 pounds, made on modern drop hammers.

Other facilities available include upsetting, trimming, threading, punching, hot-bending, broaching, descaling, heat-treating, and hot-dip galvanizing.

*Investigate our Facilities
Send Specifications for Estimates*

**MANUFACTURING DIVISION
ATLANTIC STEEL COMPANY**
Atlanta, Georgia • Emerson 3441

line of paints, was selected. He consulted with the psychiatrist, management consultants and plant executives; and examined the case histories reported by the interviewer. Describing the effect of different colors, he pointed out that blue is a soothing and cooling color; yellow a cheerful color; red, stimulating and exciting; green, refreshing and relaxing.

He stressed that warm, stimulating colors, such as red, yellow or orange are best for cold, sunless areas; and that blue or green tend to tone down brightness in excessively sunny areas and help to reduce glare. A pleasant contrast in color between walls of the building and the color of the machinery he felt to be important, since ability to look up from close work occasionally, without excessive eye adjustment to walls, floors and other surroundings, tends to minimize fatigue.

Following a detailed survey of the plant and further consultations, the color expert advised painting the walls pale green, machinery a darker green and floors a gray-green, since these colors require a minimum of eye adjustment and tend to be relaxing.

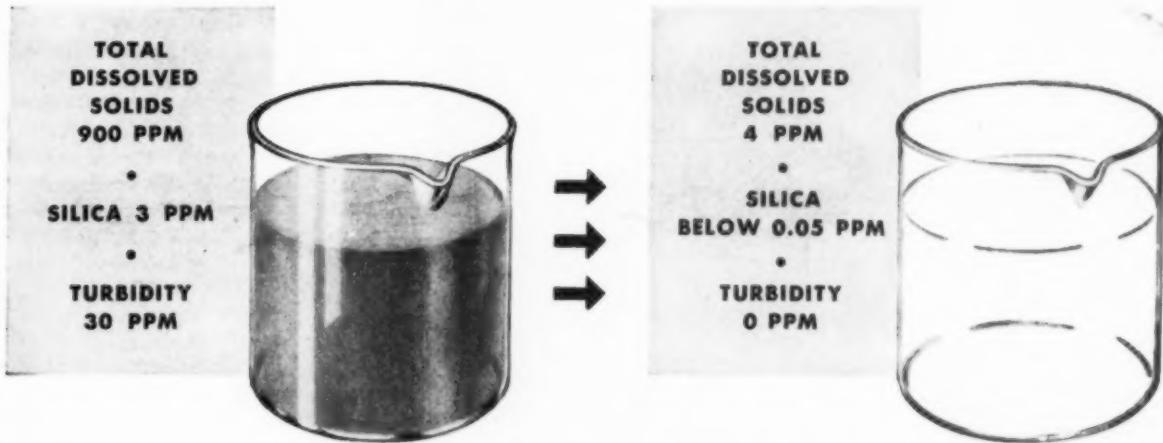
The recommendations were promptly put into effect. Records now indicate production has increased 7 per cent; absenteeism, due to eye strain and fatigue, is a thing of the past. Foremen report employees are turning out better work and are happy and enthusiastic where formerly they had been lax. Thus morale was substantially improved by a small investment that is paying handsome dividends.

Higher Voltage

ENORMOUS expansion in Southern industrial plants is causing a trend toward selecting higher distribution voltage. In many cases it has been necessary for the plants to adopt voltages of 4160 volts or 13,200 volts, whereas in the past they have been distributing current within the plants at 600 volts.

The basic cause for the change to higher voltage is the fact that many plants have now become so

A Graver Demineralizer makes the difference

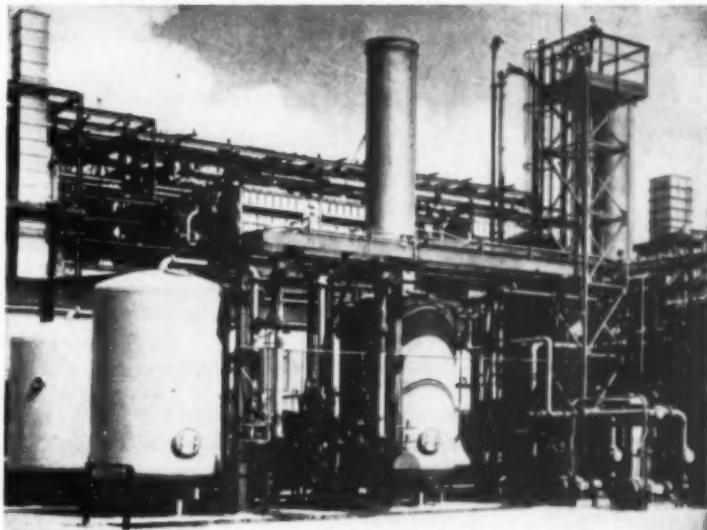


This Graver demineralizer installation had to tackle a *doubly* tough water purification problem . . . extreme hardness plus turbidity. And 600 gpm has to be treated.

But the Graver plant is combining demineralizing plus filtering of this large demand with complete success. In addition, a Graver Vacuum Deaerator following the Demineralizer completely eliminates CO_2 and reduces the oxygen below 0.2 ppm. As a result, the effluent is ideally suited for the high pressure boilers served by the Graver installation.

For similar success in solving *your* water treatment problem, investigate Graver's proven modern equipment designs based on over 40 years of specialized experience and pioneering in every water treating process.

Your request for recommendations will involve no obligation.



Double train, two-bed Graver Demineralizer installation at a large southwestern chemical plant, treating 864,000 gallons per day of raw water for 450,000 pounds per hour, 1250 psig boilers.

GRAVER WATER CONDITIONING CO.

Division of Graver Tank & Mfg. Co., Inc.

DEPT. SPI-D, 216 WEST 14TH STREET, NEW YORK 11, N.Y.

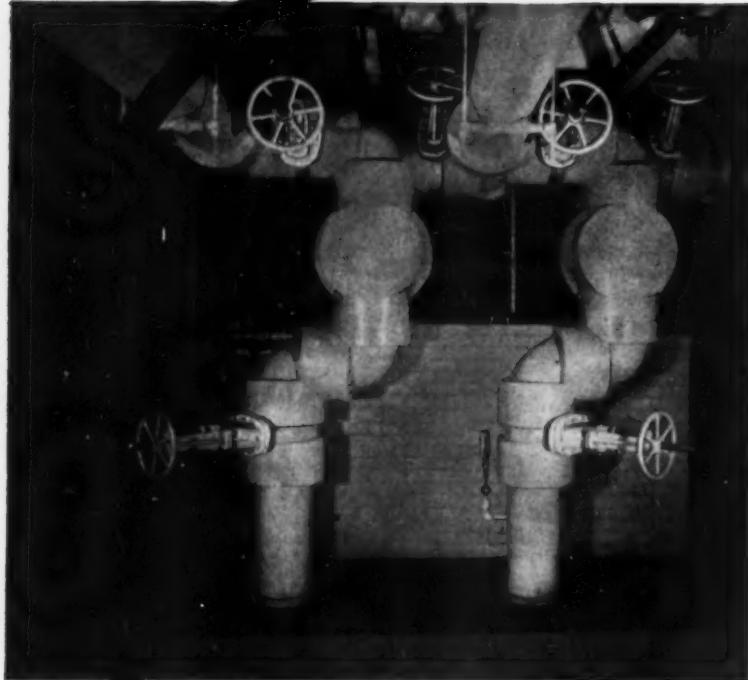
In Canada: The Bird-Archer Co., Ltd., Cobourg, Ontario

In Mexico: Proveedores Técnicos, S.A.; Puebla 259, Mexico 7, D. F.

GRAVER

GW 670

Proved DEPENDABLE



- Call it reliable!
- Call it rugged!
- Call it dependable!
- If it is a Fairbanks valve
- ... it has it!

Thousands of installations under every condition from the simplest to the most difficult, prove Fairbanks valves give dependable service, require less maintenance, last longer — often succeed where other valves fail!

That is why you find more uninterrupted service, less shutdown, in plants that specify Fairbanks 125-pound Iron Body Gate Valves — the valves with proven dependability built in!

Fairbanks Iron Body Gate Valves are bronze mounted* both with inside non-rising screw and outside screw and yoke. Available with screwed or flanged ends. Bodies and bonnets made of high strength alloy cast iron. Wedges in 2" to 4" sizes of solid bronze; in larger sizes to 24", wedges are alloy iron with rolled in bronze face rings and bronze bushed stem connections. The threaded bronze seat rings are screwed into body at angle conforming to taper of wedge.

(*ALL IRON GATE VALVES ALSO AVAILABLE.)

THE **Fairbanks** COMPANY

393 LAFAYETTE STREET, NEW YORK 3, N. Y.

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large that no equipment manufacturer can provide equipment of sufficient ampere rating to take care of the electrical requirement on such low voltages as 600.

For example, a large Southern paper mill has in progress a program involving conversion of electric power distribution from 550 volts to 4160 volts in order to provide for substantial increases in power loads which have resulted from the installation of additional pulp producing capacity, additional by-products operation, and a general speed-up of paper machines. This increase in voltage is particularly necessary to make it possible to buy and install switching equipment of sufficient interrupting capacity to safely handle the tremendously increased short circuit currents which can result when a power system is increased from 4000 kw to 15,000 or 20,000 kw.

The program being undertaken by the above mentioned plant is now only about two-thirds completed, but the engineers promise to cooperate with the editors to provide a full, detailed account of these improvements when completed.

Your Comments in Brief

SP&I's Service Staff Welcome
Plant Inquiries & Suggestions

Ground Detector

"In your October issue we noticed with considerable interest the article on 'Tracking Down Grounds with the Power On.'

"This article mentioned that the equipment used was an Allen Ground Detector. We shall appreciate your obtaining some literature for us on this type detector. . . ."

D. L. NOWELL, JR.

Production Manager

Plant No. 2

Merry Bros. Brick & Tile Co.

Augusta, Georgia

Manufactured by Ferr Manufacturing Co., of Chicago and distributed solely by the Excel Electric Service Co. For general literature write Mr. Peter J. Maher, V.P., Excel Electric Service Co., 2112 South Western Ave., Chicago 8, Illinois. You can also contact the following Allen Representative: R. E. Ward, Sr., Pres., Electric Motor Repair Co., 418 South Dawson St., Raleigh, N. C. Additional application data on the Allen Ground Detector is scheduled for our 5th Annual Plant Maintenance issue in May.

Helpful Series

"... a fine group of articles appearing in SOUTHERN POWER & INDUSTRY. I refer to 'Electricity and Electric Power' by Mr. Roy W. Wages.

"We would like to use this series of articles in our training program."

R. M. KETTENRING

Chief Electrician
Commercial Solvents Corporation
Dixie Chemical Division
Sterlington, Louisiana

Permission gladly granted. Believe you will find the new series of "Question & Answer" articles starting in the January '53 issue, of equal value. Series, written by A. T. Lohkamp, Superintendent of Power, Pasco Packing Co., Dade City, Florida, will cover distribution and controls; synchronous, three-phase, and single phase motors, technical and design data; and generator and motor selection.

Steam Generator

"Your November issue contains an article on process steam at South West Box Company, Sand Springs, Oklahoma. Mention is made of a Vapor-Clarkson steam generator. Since we have a possible application for equipment of this type we would like to get the name and address of the manufacturer."

H. G. ZEHR

Resident Engineer
Bemis Bro. Bag Company
Bemis Cotton Mill
Bemis, Tennessee

This generator is a product of the Vapor Heating Corp., 4501 W. 16th St., Chicago 23, Ill. For possible applications in your own plant we suggest you direct the inquiry to the Sales Manager of that office.

Fluid Drives

"Additional information and literature will be much appreciated on Case 15, page 100 of your 5th Annual Better Production issue."

J. E. DAVIS

Williams & Davis Boiler & Welding Co.
Dallas, Texas

This case study dealt with the installation of American Blower Corp.'s Gyrol Fluid Drives on three cranes of the Sumter Machinery Co. in Sumter, S. C. For additional information call John Bishop, the American Blower Corporation's representative at 1218 Texas Bank Bldg., Dallas, Texas.

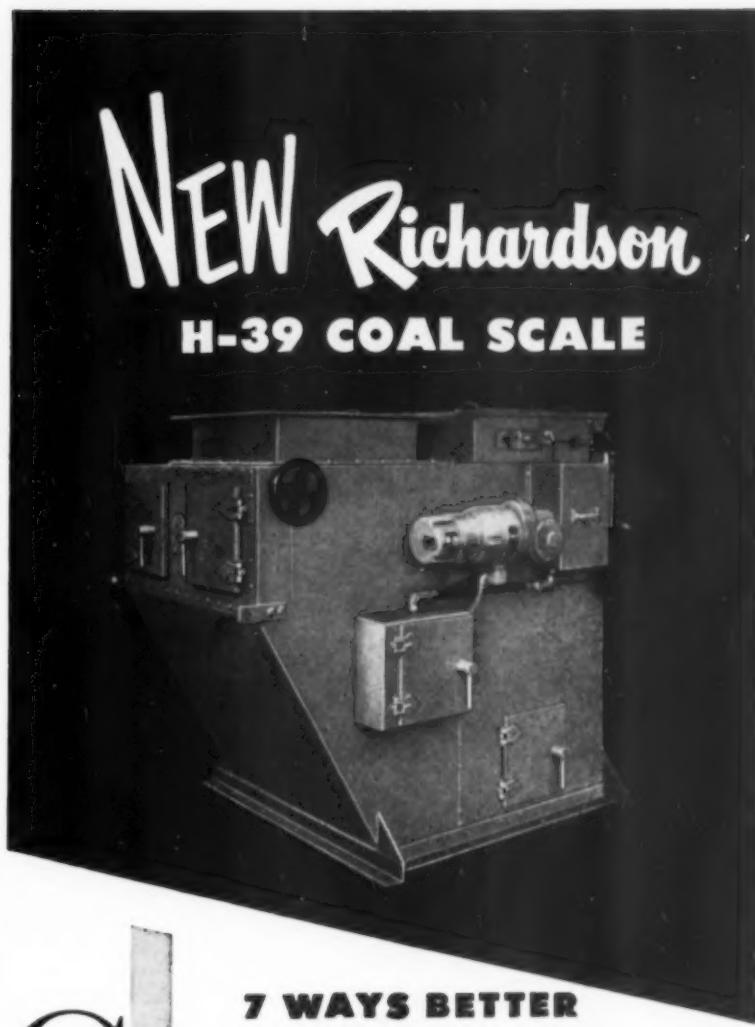
Reader Service

"I subscribed to your magazine when I was in school at Auburn and enjoy it very much.

"Am sending a card for several bulletins and catalogs. This appears to be a good service and there are several that will help me on my new job. . . ."

CHUCK WISHER

Shell Oil Company
Norco, Louisiana



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7 WAYS BETTER

1. 24" x 24" coal inlet opening—50% greater area—for maximum flow-ability of coal.
2. All wiring and controls outside coal chamber.
3. Beam-ratio test facilities *completely outside* coal chamber.
4. Simple, gravity-operated bypass arrangement with no restriction in coal flow to downspout.
5. No drag-links or electrical wiring on weigh hopper.
6. Construction of access doors makes it *impossible* for coal dust to spill out on floor when opening.
7. Unequalled nationwide maintenance and service facilities.

That's why you just can't buy better than a Richardson.

Get all the facts. Write for Bulletin 0552 today!

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ELLIOTT TWIN STRAINERS

give double-barreled protection



SIZES AND BASKET MESH TO SUIT THE NEED



Fourteen sizes—1" to 24". Basket perforations, 1/32" to 3/8". If finer mesh is desired, basket can be lined with wire cloth. You get the straining service you need with Twin Strainers.

There is practically never any need to shut down a Twin Strainer. It provides its own standby service, thrown into operation by the two-way valves which shut off the fouled chamber.

For over a generation, Twin Strainers have been standard equipment in many industries. Now redesigned with many maintenance-saving features. Get the facts—write for the Twin Strainer Bulletin.



A-317

ELLIOTT COMPANY

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AMPERE, N.J. • SPRINGFIELD, O. • NEWARK, N.J.
DISTRICT OFFICES IN PRINCIPAL CITIES

Equipment & Supplies (Starts on Page 8)

Flexible, High-Pressure Industrial Rubber Hose

REPUBLIC RUBBER DIVISION
A-8 OF LEE RUBBER & TIRE CORPORATION, Youngstown 1, Ohio, is producing a special type of industrial rubber hose called "Wiretex."



Republic's Wiretex hose is designed to carry various types of gases or fluids under both high and low pressure. Hose is not weakened by constant vibration or flexing and it will not rust or corrode.

The hose is said to have strength, flexibility, and oil and abrasion resistance. It is made with a mandrel cured, Reprene tube in lengths up to and including 60 ft. The tube is reinforced with a specially selected textile carcass which is continuously braided around the tube in multiple rubber-impregnated plies, or with alternating plies of braided fabrics and braided plies of wire, or with multiple braids of standard or extra heavy wire only. The hose carcasses are encased in either abrasion resistant, thick rubber covers or covers made of braided textiles.

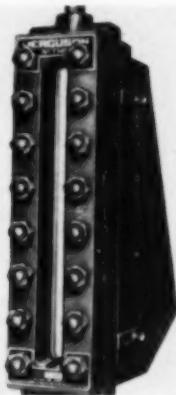
The hose is built to withstand working pressures as high as 5,500 psi and temperatures from minus 40 F to plus 200 F. Standard sizes range from 3/16 in. to 2 in. for hydraulic control hose.

Steam Gage Illuminator

A-9 JERGUSON GAGE & VALVE Co., 80 Fellsway, Somerville, Mass., has announced a new illuminator for steam gages, which permits instant and accurate gage readings of the boiler water level over longer distances, through dust particles in the air or deposits on the gage glass, or in poorly lighted areas.

When a gage is equipped with the illuminator, the water column shows blue-green, topped with an intensely brilliant emerald green spot at the water level, to give an unmistakable water level indication. The illuminator, designed to take full advantage of optical principles, consists of a mercury vapor bulb enclosed in a steel housing, and a ballast box equipped

for easy mounting at a convenient spot. The illuminator clips to the gage cover with two sets of brackets, making installation easy with no alterations to the gage.



Mercury Vapor Illuminator of the Jerguson Gage & Valve Co.

The illuminator is furnished in weatherproof construction suitable for outdoor use. It is made in sizes to fit standard gage sizes, and is also available with a 100 w incandescent bulb for use on low pressure steam service gages.

Cold Weather Liner for Safety Helmets

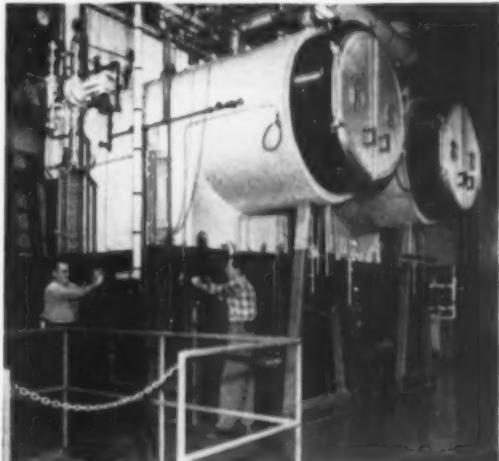
INDUSTRIAL PRODUCTS COMPANY, 2892 N. Fourth St., Philadelphia 33, Pa., announces a new winter liner for wear under safety helmets in cold weather.



The liner is worn separately, not attached to the helmet. It is made of soft, closely woven woolen material, fits snugly over the head, neck and ears, and is provided with tape ties for fastening under the chin. It is offered in tan color, and is carefully constructed with lock stitching on all seams. The liner is available in a complete range of standard head sizes.

MORE ENGINEERING
MORE MATERIAL
MORE EXPERIENCE

MAKE THE DIFFERENCE



KEWANEE

STEEL BOILERS

Set a Kewanee alongside other boilers and even a quick look shows their extra ruggedness, finely finished castings and other evidences of a high quality product. Then look inside! Check the specifications, measurements, size of fire chamber, area of heating surface and one finds many other differences. More engineering, more material, more labor and more experience go into every Kewanee . . . whether for heating, power or process steam . . . so owners get more from them.

With experienced engineers and mechanics on their staff, a great air line knows mechanical equipment. So it means much when concerns such as Northwest Air Lines install Kewanee Boilers in an important building.

NORTHWEST AIRLINES BUILDING

International Airport
Seattle-Tacoma, Wash.

Designed and Engineered by
AUSTIN COMPANY

2 Kewanee Heavy-Duty Boilers,
Oil-Fired from the rear by
W. E. BEGGS, INC., Seattle

KEWANEE-ROSS CORPORATION

Division of American Radiator & Standard Sanitary Corporation
KEWANEE, ILLINOIS



KENNEDY

Underwriters' Approved

VALVES

When you need a Valve that's always on duty... always ready

Whenever life and property are at stake, the complete reliability and dependability that are built into every KENNEDY Valve are plus safety features. The valves listed below are approved by Underwriter Laboratories and Associated Factory Mutual Fire Insurance Companies.

IRON BODY DOUBLE-DISC GATE VALVES



Fig. No.	Type	Sizes	Working Pressures
67	O.S. & Y. Screwed	2½" to 12"	Cold Water, non-shock, 175 lbs.
68	O.S. & Y. Flanged	2½" to 14"	2½" to 12"—Cold Water, non-shock, 175 lbs.; 14"—150 lbs.
681	O.S. & Y. Bell Ends	4" and 6" to 14"	Same as Fig. 68
701	Indicator Post Gate Valve—Flanged	4" to 14"	4" to 12"—Cold Water, non-shock, 175 lbs.; 14"—150 lbs.
702	Indicator Post Gate Valve—Screwed	4" to 12"	Cold Water, non-shock, 175 lbs.
70	Indicator Post Gate Valve—Bell Ends	4" to 14"	Same as Fig. 701

BRONZE VALVES



66	O.S. & Y. Wedge Disc Gate Valve	¾" to 2"	Cold Water, 175 lbs.
38	Hose Gate Valve no cap and chain	2½"	Cold Water, 175 lbs.
39	Hose Gate Valve with cap and chain	2½"	Cold Water, 175 lbs.
93	Angle Hose Valve	2½"	Cold Water, 175 lbs.
935	Angle Hose Valve	2½"	Cold Water, 300 lbs.

IRON BODY CHECK VALVES



125	Screwed Check Valve	4" to 6"	Cold Water, non-shock, 175 lbs.
126	Flanged Check Valve	4" to 12"	Same as Fig. 125
127A	Bell-end Check Valve	4" and 6" to 12"	Same as Fig. 125

INDICATOR POSTS

KENNEDY Indicator Posts provide a safe and easy means of operating valves installed underground or behind walls. Completely enclosed, operation is unaffected by rain, snow, or frost. Highly visible aluminum on black indicator, adjustable to valves of different sizes, protected by extra-thick moist-free glass. For wall or ground mounting.

Write for full particulars

Buy from Your Local Distributor



THE

KENNEDY
VALVE MFG. CO. • ELMIRA, N.Y.

VALVES • PIPE FITTINGS • FIRE HYDRANTS



new equipment (continued)

For more data circle item code number
on the postage free post card—p. 17

Dunking Stations Solve Plant Smoking Problem

STANDARD INDUSTRIAL PRODUCTS COMPANY, PO Box 794, Peoria, Ill., announces the production of Sipco Dunking Stations to aid good housekeeping in plants, and to help prevent fires.

The units can be installed on walls, columns, posts, machines, or can be used on stands with non-tipping bases, at strategic points where smoking is permitted in the plant.



Sipco's Safe Smoker can be used as a unit by itself, canister and sign only, or as a canister alone.

Cigars, cigarettes, and matches are immediately extinguished because Sipco canisters are partially filled with water. There is no smoldering, and canisters will not rust through because they are made of heavy cast aluminum. The canister is fitted with a hinged lid for easy dumping and cleaning. Canister proper is removable for cleaning.

"Stand-Up" Fork Truck Operates Within Its Length

CLARK EQUIPMENT COMPANY, Industrial Truck Division, Battle Creek, Mich., has announced a new electric "stand-up" fork truck designed for warehousing and freight terminals where close quarters and narrow aisles demand high maneuverability and where the driver must continually mount and dismount.

Driver comfort, easy "off-and-on" access, convenience of controls and excellent visibility are features claimed for the new "Stoway."

The truck has two methods of braking. Heavy duty hydraulic service brakes on the drive wheels serve regular and parking brake operations. The drive and pump motors are completely enclosed against corrosion, condensation or foreign particles. The automatic acceleration system has a



The 60 in. turning radius and 360° steering allows Clark Equipment Company's Stoway to operate within its own length.

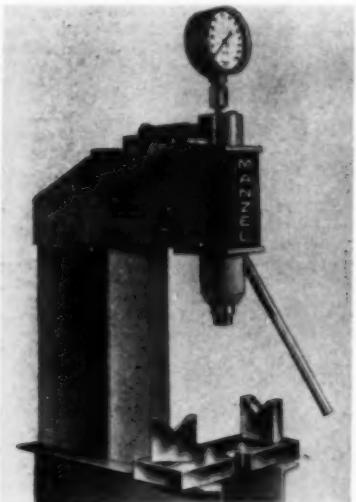
pre-set time delay between each point of power. It is impossible either to overload the motor by fast shifting or by simultaneously applying both forward and reverse power.

Capacity is 2000 lb at 24 in., 2500 at 15 in., and 1650 at 30 in. Travel speed is 6.5 mph empty, 6 mph loaded, with four speeds forward or reverse.

Hydraulic Arbor Press

A-13 MANZEL, 318 Babcock St., Buffalo 10, N. Y., has developed a new bench type arbor press having a wide range of uses. Design tested, the 10 ton press is now in production.

Press is widely usable in tool room, laboratory, or machinery overhaul department, for such applications as straightening, material testing, bending, bushing or bearing removal and replacement, etc. Gauge registering in tonnage is available as optional equipment. Vee blocks and bearing plate furnished as illustrated.



Ground Ball Joint makes 'em LEAKPROOF



This True Ball Joint Makes the Difference →

True Ball Joint—Dart seats are spherically ground to form wide, true-bearing surfaces. Seats remain unscarred and true — always in shape for repeat use. Used over and over again — Darts stay tight without jamming.

QUICK FACTS

- 2 Bronze seats resist pitting and corrosion — provide years of leak-proof service
- Heavy shoulders can withstand brutal wrenching
- Nut and body of air-refined, high test iron are practically indestructible

These Dart features mean important savings over the years for every user.



DART UNION COMPANY
Providence 5, Rhode Island
The Fairbanks Co. — Distributors
Boston • New York • Pittsburgh • Rome, Ga.

DART
UNIONS

NEWS for the South and Southwest

Atlantic Steel Opens Modern Home for Expanding Warehouse Division

Highly successful two day open house and trade show keynotes opening of warehouse division facilities.

In early November, the Atlantic Steel Company dedicated the new home of its Warehouse Division at 575 Fourteenth St., N.W., Atlanta, Georgia. Covering over 64,000 sq ft, the modern warehouse building incorporates the latest lighting and heating equipment to insure safe and comfortable working conditions. Modern sawing, shearing and flame cutting equipment and materials handling techniques facilitate deliveries to industrial customers throughout the Southeast.

More than 12,000 visited the new Warehouse Division facilities during a successful two day open house and

trade show. A wide range of diversified stock material occupied half of the warehouse building and 69 exhibits of suppliers and customers products filled the other half. Supplier companies effectively displayed materials stocked by Atlantic Steel's Warehouse Division and Southern manufacturers used this same trade show approach in exhibiting products made from Warehouse purchased materials.

Exhibits featured stainless steel products used in the dairy, textile and food processing industries, equipment for restaurants, and accessories for the automotive and allied

Warehouse Division Brief

Through its Warehouse Division, Atlantic Steel Company offers one of the South's largest varieties of steel products and a complete warehouse service.

In addition to the full line of Dixisteel hot rolled carbon bars and shapes, the warehouse division carries in stock stainless steels, galvanized sheets and roofing, structural sections, plates and cold-finished bars. Industrial fencing, with complete installation service, can be obtained through the fence enclosure department of the warehouse division. The Division is also local dealer for Quonset buildings.

M. C. Sarran, manager of the Warehouse Division, directs overall activities, including purchase of products, sales analysis and service rendered.

John T. Butler, assistant manager, heads special fence enclosure and Quonset building departments.

W. J. Gorman, office manager, buys and expedites shipment of most items sold by the division.

Fred O. Reese, metallurgist, helps customers choose correct steels for fabrication, specializing in the uses and treatment of all stainless, alloy and high-carbon steels.

These key personnel are supplemented by a staff of over 20 sales correspondents and industrial salesmen.

fields. Decorative wrought iron work, power mowers, toys, agricultural implements, electrical gear, materials handling equipment, boilers, tanks, tools, industrial equipment and consumer items were displayed. There was a wide diversification of metal products, both stainless and carbon steel, produced in the Southeast from



During the Open House and Trade Show this standard Quonset building was erected in the warehouse to serve as a refreshment center.

A safety exhibit featured the various items of protective equipment used by Atlantic Steel's employees.

Inspecting a stainless steel kettle are: **H. B. Johnson**, Atlantic Steel vice-president; **R. J. Working**, Republic Steel's Birmingham district sales manager; **Larry Hamaker**, vice-president of Republic Steel; **Fred Young**, general sales manager of Republic's Union Drawn plant; and **Robert S. Lynch**, president of the Atlantic Steel Company.





POSITIVE! EFFICIENT! SAFER!
VALVE CONTROL
AT LOWEST COST!

Babbitt
—Adjustable—
SPROCKET RIM
with Chain Guide

INSTALLED, AND OPERATING,
IN ONLY A FEW MINUTES

Range of 10 ADJUSTABLE sizes fits all valve wheels, with rising or non-rising stems, from 2 to 30 inches diameter.

Jenkins Brothers, Atlanta, and the Fairbanks Co., Rome, have complete stocks. Other distributors in principal cities. Or send for Catalog Folder SP-2.

BABBITT STEAM SPECIALTY CO.

1 Babbitt Square, New Bedford, Massachusetts



FABRICATION and ERECTION by FINNIGAN CRAFTSMEN

Skilled craftsmanship and over 60 years of experience made the erection of the two 40' 0" (dia) x 30' oil storage tanks and three smoke stacks (illustrated above) for Graniterville Company, S. C., a routine assignment.

A wire or letter will bring a qualified representative to discuss your problems with you.

J. J. FINNIGAN CO.

INC.

455 MEANS ST., N. W.
ATLANTA, GEORGIA

VERTICAL BOILERS
ALUMINUM • COPPER • STAINLESS STEEL • STAINLESS CLAD TANKS
STEEL SMOKESTACKS • SMOKE BREECHINGS • AIR COMPRESSOR TANKS

* Making Shapes From Boiler Plate Since Eighteen Hundred and Eighty-Eight *

cool off the
HOT SPOTS



cut heat losses
... save power,
fuel and money with

B-H BLANKETS

Here is high performance insulation, effective up to 1200° F. It allows close control of operating temperatures, insuring maximum output and efficiency of equipment. Chemically stable, black rockwool is felted in large sheets between different types of metal fabrics.

Soft edges interlock and form a continuous, tight blanket of insulation. It can be covered with B-H No. 1 or B-H Powerhouse finishing and insulating cement for a permanent job... For help on any specific application or selection problem, you can depend on B-H Engineered Insulation Service.

Baldwin-Hill

Clip on signed letterhead and mail

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OUT

BALDWIN-HILL COMPANY

602 Breunig Ave., Trenton 2, N.J.

Please send complete information on

BLANKETS... Metal-reinforced, flexible, felted, black rockwool insulation

NO. 1 INSULATING CEMENT... All-purpose, rust-inhibiting, plastic cement

MONO-BLOCK... Rigid, felted, black rockwool block—for high and low temperature use

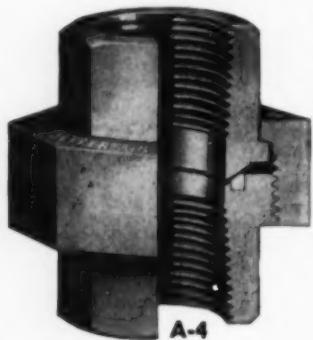
POWERHOUSE CEMENT... High adhesion, black rockwool, insulating-finishing cement

**Here's what
you get when
you use**

JEFFERSON

300 LB.

**Air-Tested
Malleable Iron
UNIONS**



Here's a quality product . . . one you can depend on for even the toughest jobs . . . a union fabricated of Air Furnace Malleable Iron, with sound, uniform seat rings cut from seamless drawn brass tubing instead of cast brass seat rings.

To use Jefferson Unions means that you'll get the maximum in carefree service . . . service that is insured before shipment by Jefferson's rigid air tests and inspection . . . a service that is further insured by the use of malleable iron having an average tensile strength of 55,000 p.s.i.

The difference in performance of Jefferson Unions more than offsets a slightly higher price.

The Jefferson line includes AAR male and female unions, Enduro 300#; Excel 250# and Master 150# Unions. All-iron seats are also available in all types.

Contact your nearest distributor or us direct for your requirements.

**JEFFERSON
UNION CO.**

650 WEST 26th ST., NEW YORK 1.
79 GOODING ST., LOCKPORT, N.Y.
45 FLETCHER AVE., LEXINGTON, MASS.

news for the South and Southwest (continued)

material secured through the company's Warehouse Division.

Open house guests also visited Atlantic Steel's new electric melt shop and got a close-up view of the Southeast's largest electric furnace—60 ton capacity—from charge to tap.

Company Expansion

Completion of this modern new home for its Warehouse Division marks another step in the continual expansion of the Atlantic Steel Company. From its beginning in 1901, with one mill producing only cotton ties and barrel hoops, the plant now covers almost 200 acres and makes 65 different products, in over a thousand sizes, and provides jobs for over 2,000 employees.

Atlantic Steel is the home of "well-made, well-known, and well-liked" Dixisteel products. Supplementing three open hearth furnaces, with an annual rated capacity of 188,000 tons, an electric furnace placed in operation in early 1952, increased the company's total steel output to 300,000 tons annually.

Heating & Ventilating Show

The 11TH INTERNATIONAL HEATING AND VENTILATING EXPOSITION is being held in Chicago at the International Amphitheatre on Jan. 26-30. The Exposition, which is under the auspices of the AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS, is held concurrently with the Society's 59th Annual Meeting.

The event is scheduled to present a wide range of heating and air conditioning applications, and includes an educational exhibit of some of the Society's research projects.

The exposition is under the management of the International Exposition Company of New York, Charles F. Roth, Mgr. and E. K. Stevens, Assoc. Mgr.

Materials Handling Show

The fifth NATIONAL MATERIALS HANDLING EXPOSITION will be held at Convention Hall, Philadelphia, May 18-22. THE MATERIALS HANDLING INSTITUTE, organization of handling equipment manufacturers, will sponsor the show, which will be held concurrently with a series of conferences to be conducted by the AMERICAN MATERIALS HANDLING SOCIETY, composed of executives of companies which use materials handling systems.

Advance registration cards and

hotel information may be obtained from Clapp & Poliak, Inc., 341 Madison Ave., New York 17, N. Y.

Plant Maintenance Conference

THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS and the SOCIETY FOR THE ADVANCEMENT OF MANAGEMENT will jointly sponsor the PLANT MAINTENANCE CONFERENCE to be held in Cleveland, Jan. 19-22.

The Exposition will include an extensive exhibit of products, panel discussions, sectional conferences, round-tables, plant tours and a banquet.

Advance registration cards and hotel information may be obtained from Clapp & Poliak, Inc., 341 Madison Ave., New York 17, N. Y.

Southern Safety Conference

The 14TH ANNUAL SOUTHERN SAFETY CONFERENCE AND EXPOSITION will be held at the Atlanta Biltmore Hotel in ATLANTA, GEORGIA, March 1-3. In addition to general sessions, there will be fourteen sectional programs on specific safety subjects, and an exhibit of safety equipment.

For further information, contact W. L. GROTH, Executive Director, P. O. Box 8927, RICHMOND 25, VIRGINIA. Registration fee is \$4.00.

New Basic Materials Show

AN EXPOSITION OF BASIC MATERIALS FOR INDUSTRY, planned to present the whole range of new materials from the laboratories of industry and needed for product development, is scheduled to be held in New York, at Grand Central Palace, June 15-19. DON G. MITCHELL, president of Sylvania Electric Products, Inc., is chairman of the board of sponsors, which is comprised of top executives of twenty major companies.

Simultaneously with the exposition, a series of technical conferences will be conducted to discuss the properties and potentialities of the new materials.

The exposition and conference will be under the management of Clapp & Poliak, Inc., 341 Madison Ave., New York 17, N. Y.

Clark Equipment Co., S. C.

THE INDUSTRIAL TRUCK DIVISION OF CLARK EQUIPMENT COMPANY, Battle Creek, Mich., has announced the appointment of LUKAS EQUIPMENT COMPANY, 1804 Blanding St., COLUMBIA, S. C., as an authorized dealer in the State of South Carolina.

FUTURE EVENTS Of Engineering Interest

PLANT MAINTENANCE CONFERENCE, Clapp & Poliak, Inc., 41 Madison Ave., New York 17, N. Y.

Jan. 19-22, Plant Maintenance Conference and Plant Maintenance Show, Public Auditorium, Cleveland, Ohio

AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS, Charles F. Roth, Mgr., International Exposition Company, Grand Central Palace, New York 17, N. Y.

Jan. 26-30, 1953, 11th International Heating & Ventilating Exposition, International Amphitheatre, New York, N. Y.

NATIONAL GASOLINE ASSOCIATION OF AMERICA, Wm. F. Lowe, Secy., 422 Kennedy Bldg., Tulsa 3, Okla.

Feb. 27, 1953, Regional Meeting, Scharbauer Hotel, Midland, Texas

April 29-May 1, 1953, 32nd Annual Convention, Rice Hotel, Houston, Texas

SOUTHERN SAFETY CONFERENCE, W. L. Groth, Exec. Dir., Box 8937, Richmond 26, Va.

Mar. 1-3, 14th Annual Southern Safety Conference & Exposition, Atlanta Biltmore Hotel, Atlanta, Ga.

MATERIALS HANDLING SHOW, Clapp & Poliak, Inc., 341 Madison Ave., New York 17, N. Y.

May 18-22, Fifth National Materials Handling Exposition and Conference, Convention Hall, Philadelphia, Pa.

EXPOSITION OF BASIC MATERIALS FOR INDUSTRY, Clapp & Poliak, Inc., 341 Madison Ave., New York 17, N. Y.

June 15-19, Exposition and Conference, Grand Central Palace, New York 17, N. Y.

AMERICAN WELDING SOCIETY, National Secretary, 33 West 39th St., New York 18, N. Y.

June 18-19, National Spring Technical Meeting with Welding and Allied Industry Exposition, Shamrock Hotel and Hall of Exhibits, Houston, Texas

Blair of Atlantic Steel Dies

HIRAM C. BLAIR, traffic manager of ATLANTIC STEEL COMPANY, died recently in ATLANTA, GEORGIA.

Mr. Blair, who was formerly with the Southern Railway System, joined Atlantic Steel in 1935. During 1949, he was named one of the outstanding men in the National Organization of Traffic Managers, in Chicago.

Layne & Bowler, Memphis

Appointment of A. O. PUTNAM as Public Relations Director of LAYNE & BOWLER, INC., MEMPHIS has just been announced by W. H. REEVES, Vice-President and General Manager.

Mr. Putnam has been advertising manager of the Corporation for some time and the new appointment brings all advertising and public relations under his direction. He is a native Texan and has had wide experience in the advertising field, holding responsible executive positions with leading firms in Atlanta, Dallas, Memphis and other Southern cities.

Layne & Bowler, Inc., is engaged in world-wide sales and installation services on water wells and pumps.

Control Equipment Co. Established in Atlanta

R. P. SAUNDERS and C. L. SAUNDERS have established the CONTROL EQUIPMENT COMPANY, 1222 Peachtree St., N. E., ATLANTA 5, GEORGIA, to serve the process industries in the Southeast.



R. P. Saunders of the Control Equipment Co. of Atlanta, Ga.

Control Equipment Company represents Automatic Temperature Control Co., Taco West Corp., Hammel-Dahl Co., Panellit, Inc., Panalarm Products, Inc., Panascan, Inc., Continental Equipment Co., Instruments, Inc., Precision Thermometer & Instrument Company, and Superior Controls and Acragage Corp.

R. P. Saunders was formerly with the Brown Instruments Division, Minneapolis-Honeywell Regulator Co., and over 5 years with Fulton-Siphon. C. L. Saunders was formerly Chicago regional manager of Minneapolis-Honeywell, with the WPB in Washington and president, Wheelco Instruments.

Reliance—South, Southwest

THE RELIANCE ELECTRIC & ENGINEERING COMPANY, Cleveland, Ohio, has appointed SMITHCO ENGINEERING, 3348 South Erie St., TULSA, OKLAHOMA, as sales representatives throughout Oklahoma.

O. L. SMITH, owner, and JAMES H. LEE, engineer, of the newly appointed company are both application specialists with wide experience in electric motor drive problems. Mr. Smith has been identified for a number of years with the oil industry and its specialized requirements.

Reliance has also announced that REX T. WILLARD, sales application engineer in the ATLANTA, GEORGIA office, has been transferred to the company's BIRMINGHAM, ALABAMA area to replace ROBERT B. REED, who was transferred to Detroit.

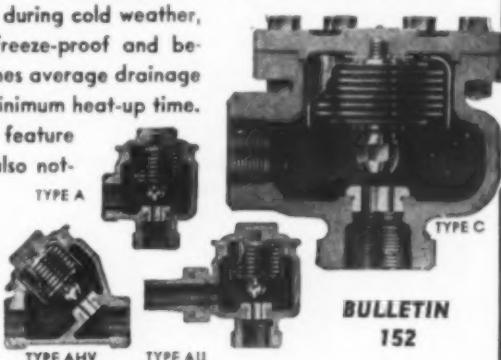
NICHOLSON MAKES

Freeze-Proof Steam Traps

for Every Plant Use

Because they drain completely when cold, these four types of Nicholson steam traps are positively freeze-proof. Can be freely installed outdoors. Universally recommended for use in lines which need not be in continuous use during cold weather, because they are freeze-proof and because their 2 to 6 times average drainage capacity results in minimum heat-up time.

The non-air-binding feature of Nicholson traps also notably facilitates heat transfer in severe weather. Types for every plant use. Sizes $\frac{1}{4}$ " to 2"; pressures to 250 lbs.



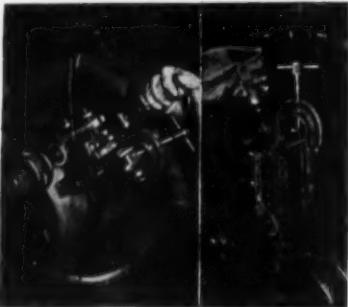
BULLETIN
152

175 OREGON ST., WILKES-BARRE, PA.

W. H. **NICHOLSON** & CO.
TRAPS • VALVES • FLOATS

MARTINDALE

COMMSTONE HOLDERS



Hold Commstones rigid and true for concentric resurfacing of commutators and slip rings while running at normal speeds in their own bearings. Interchangeable boxes 1", 2", and 3" wide handle grinding jobs up to 4 1/4" wide.

BLOWERS AND VACUUM CLEANERS



MARTINDALE COMMSTONES AND COMMUTATOR GRINDING TOOLS



MICA UNDERCUTTERS FOR SLOTTING COMMUTATORS



Nine Motor Driven Types MARTINDALE PROTECTIVE MASKS



Weigh less than 1/2 ounce

VISIT OUR BOOTH - NO. 510

PLANT MAINTENANCE SHOW

CLEVELAND
Jan. 19-22, 1953

Write for 64-page Catalog describing these and many other products for Industrial Maintenance, Safety and Production

MARTINDALE ELECTRIC CO.
1334 Hird Ave. Cleveland 7, Ohio

news for the South and Southwest (continued)

Allis-Chalmers, Miami Office

J. E. WATSON has been appointed representative in charge of ALLIS-CHALMERS MIAMI office.

The Miami office has been made a branch of the Tampa district under the supervision of E. T. CUDDEBACK, manager of the Florida district.



J. E. Watson is now in charge of Allis-Chalmers Miami, Florida, office.

Watson joined Allis-Chalmers in 1949 and was a representative in the Birmingham office before being transferred to Miami in June, 1951. He is an electrical engineering graduate of Duke University and a member of the American Institute of Electrical Engineers.

Miami was formerly a district office under the management of JOSEPH BRONAUGH, who was recently named manager of the Cleveland district office.

Frick Celebrates Centennial

FRICK COMPANY, Waynesboro, Pennsylvania manufacturers of refrigerating and air conditioning equipment, farm and sawmill machinery, is celebrating the founding of the company one hundred years ago by George Frick. A Centennial History, fully illustrated and describing the early beginnings and progress of the organization, is available from the company at \$1.00 per copy.

The latest Frick achievement is a new method of cooling the reactors in which synthetic rubber is formed. Sets of vertical direct-expansion coils, under automatic control, now cool the butadiene, styrene and other chemicals to double the production of "cold" rubber in the time previously required.

The company has branches and distributors throughout the world; its service includes recommendations, layouts, estimates, sales, manufacture, installation, and maintenance. Much of its work is custom-engineered.

Diesel Engine Manufacturers Association Elects Officers

At the annual meeting of the DIESEL ENGINE MANUFACTURERS ASSOCIATION held in New York City in November, the following officers were elected for 1953:

President, A. W. MCKINNEY, executive vice president of The National Supply Company of Pittsburgh; vice president, WALTER A. RENTSCHLER, vice president of Baldwin-Lima-Hamilton Corporation of Philadelphia; vice president, WILLIAM E. BUTTS, president of Enterprise Engine & Machinery Company of San Francisco; treasurer, ROBERT H. MORSE, JR., president of Fairbanks, Morse & Co. of Chicago, and as secretary and executive director, HARVEY T. HILL of Chicago.

Towne Represents Clark Equipment Co., in Texas

CLARK EQUIPMENT COMPANY, Battle Creek, Mich., has announced the appointment of the TOWNE INDUSTRIAL EQUIPMENT COMPANY, INC., 1410 S. Akard St., DALLAS, TEXAS, as its authorized dealer in 129 Texas counties.



Fred T. Towne heads The Towne Industrial Equipment Company of Dallas, Texas, now a Clark Equipment Co. dealer.

FRED T. TOWNE is president of the company in Dallas, and ERNEST TAYLOR, JR., is sales manager.

Clark Equipment Company produces materials handling equipment in the fork-lift truck (gas-powered, electric battery-powered, and diesel-powered), industrial towing tractor in gas and in battery-powered types, and battery-powered hand truck categories. The Towne Industrial Equipment Company has been engaged in the sale of materials handling equipment since 1948.

Foxboro Expansion—Dallas

New factory facilities for the assembly of control valves were recently acquired at DALLAS, TEXAS, by THE FOXBORO COMPANY, Foxboro, Mass., manufacturer of a complete line of industrial instruments for process measurement and control. Convenient to the office address, 1710 N. Akard St., the new quarters practically double the area devoted to valve assembly and warehousing, and will facilitate rapid delivery and service to industries throughout the South and Southwest which have been served from the Dallas Branch for over 20 years.

Briefs

What Your Leading Equipment And Supply Manufacturers Are Doing

WILLIAM H. HENSON, formerly manager of the sales engineering department, NORTON COMPANY'S Refractories Division, has been appointed special sales representative for that division.

New plant additions at THE THOMAS & BETTS CO., Elizabeth, N. J., are expected to speed up deliveries to customers by providing an extra 69,000 sq ft for production, storage and shipping. According to N. J. MACDONALD, vice president of the company which manufactures electrical fittings and specialties, the new facilities cost over \$600,000, and tops off a five-year building program for the company.

AMERICAN BLOWER CORPORATION has announced the appointment of R. L. BERNHARD as manager of the newly created Centrifugal Compressor Department. Mr. Bernhard, a graduate of the University of Alabama, has more than 18 years of experience in the centrifugal compressor field.

FREDERICK W. ARGUE has been named an Assistant Engineering Manager of STONE & WEBSTER ENGINEERING CORPORATION in Boston. He was formerly Assistant Chief Power Engineer for the company.

ERASCO SERVICES INCORPORATED has announced the election of F. C. GARDNER as Executive Vice President of the firm. K. W. REECE has been elected Vice President in charge of engineering and construction, and W. H. COLQUHOUN has been made Engineering Manager of the company.

John F. Templeton Co. Expands Atlanta Office

JOHN F. TEMPLETON CO., 901 William Oliver Bldg., ATLANTA, GEORGIA, announces the appointment of Mr. Templeton's brother, D. E. TEMPLETON, to handle sales for accounts in the Atlanta vicinity, as of Sept. 1, 1952.



D. E. Templeton is handling account sales for the John F. Templeton Co., manufacturers agents of Atlanta, Georgia.

The company, established in November, 1949, represents SARCO COMPANY, INC., PIPING SPECIALTIES, INC., REFRACATORY & INSULATION CORP., STILLWATER STEAM CONDUIT CO., and CHILDERS MANUFACTURING CO., in Atlanta and surrounding area. The new

arrangement enables the company to give closer attention and better service to established customers, and allows for needed manpower to meet fast growing industrial needs in the area.

Powers Regulator—Atlanta

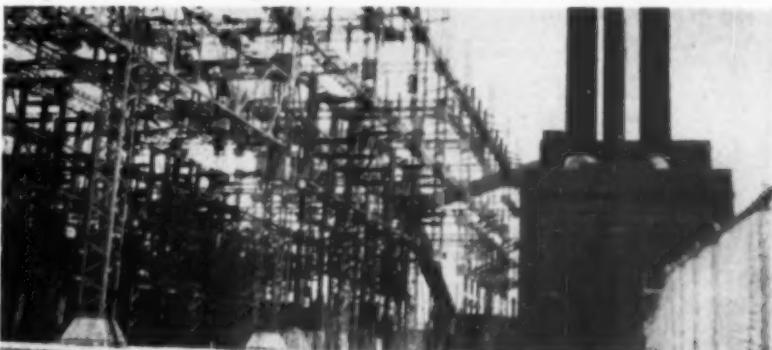
THE POWERS REGULATOR COMPANY has announced the opening of its new office at 1333 Spring Street, N. W., ATLANTA, GEORGIA. EDWIN R. Foss is District Manager of the Atlanta area.

Standard-Coosa-Thatcher Co., Chattanooga, Elects Officers

S. HERSCHEL HARRIS, formerly vice president in charge of operations, was elected president of STANDARD-COOSA-THATCHER COMPANY, CHATTANOOGA, TENNESSEE, at the annual meeting. He succeeds RICHARD C. THATCHER, president for the past 18 years, who was elected chairman of the board.

RICHARD C. THATCHER, JR., was elected assistant vice president. He was formerly thread sales manager. ROY E. BUTLER, formerly chief accountant, was elected assistant treasurer.

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all 3 more efficiently maintained by Subox anti-corrosive paints

Subox and Subalox provide maximum protection — as primers, finishing coats; as spot coat, single complete coat or combination. Can be applied over new, rusty or old painted surfaces including galvanizing. They're rust-inhibitive, weather resistant — effective against moisture, fumes, condensation.

Pb20, chemically active suboxide of lead — the distinctive basic pigment — gives Subox paints their unique efficiency.

Backed by a quarter century of successful application throughout the United States and Canada.

WRITE FOR SIMPLIFIED PAINT SYSTEMS DATA AND FULL INFORMATION.

Subox Inc.

6 FAIRMOUNT PLANT

HACKENSACK N. J.

news for the South and Southwest (continued)

Pond-Halfacre Represents Automatic Transportation

CECIL R. POND, BIRMINGHAM, ALA., franchise representative for the AUTOMATIC TRANSPORTATION COMPANY, Chicago, manufacturer of electric industrial trucks, has formed a partnership, the POND-HALFACRE COMPANY, it was announced recently.

Joining Pond as partner in the reorganization is I. L. HALFACRE, from 1934 to 1940 with the Barrett division of Allied Chemical and Dye Corporation. Since that time he has specialized in building materials sales.

Territory of the Automatic representative includes ALABAMA and the northwestern part of FLORIDA. Headquarters are at 1723 Lomb avenue, Birmingham.

Pittsburgh Corning—Mo.

PITTSBURGH CORNING CORPORATION has announced the opening of a district sales office in The Fairfax Bldg., 101 West 11th St., KANSAS CITY, MISSOURI.

HOWARD G. JONES is District Man-



H. G. Jones, district manager of the Pittsburgh Corning Corporation's Kansas City sales office.

ager of the new office. Mr. Jones was formerly a field representative for Pittsburgh Corning in the Southern Illinois, Kansas and Missouri area.

The office will service distributors of the company's products in an area of twelve states including Kansas, Missouri, Northern Texas, and Oklahoma.

Terry Steam Turbine Agent Opens Office in St. Louis

THE HESLER COMPANY, which has represented THE TERRY STEAM TURBINE COMPANY in KANSAS CITY, Mo., since 1946, has recently opened an office at 1110 Brentwood Blvd., St.

LOUIS 17, Mo. The sale of Terry mechanical-drive turbines, turbine generating sets and high-speed gear units in the St. Louis territory will be under the direction of JAMES F. HESLER, one of the four brothers who operate The Hesler Company.

Ingalls Iron Works, Houston

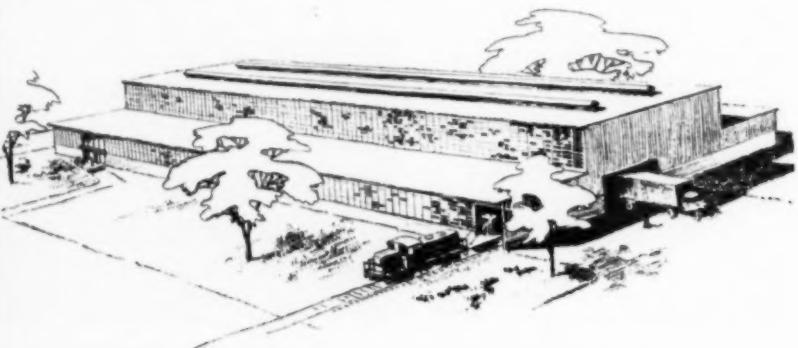
THE INGALLS IRON WORKS COMPANY, BIRMINGHAM, ALABAMA, and its subsidiaries, The Ingalls Shipbuilding Corporation and The Steel Construction Company announce the appointment of WILLIAM D. KENT as district sales engineer with headquarters at 507 Melrose Building, HOUSTON 2, TEXAS.

A graduate of the Missouri School of Mines and Metallurgy, Mr. Kent was former chief petroleum engineer of the Salt Dome Oil Corporation and the Tidelands Oil Corporation.

Utica Southeastern Repr.

UTICA DROP FORGE & TOOL CORPORATION has announced the appointment of THERON D. WHIDDEN, JR., 1110 McKinley Court, JACKSONVILLE, FLORIDA, as Southeastern representative for the company's complete line of tools.

Mr. Whidden's appointment is in line with Utica's policy of promoting close cooperation between wholesalers, and industrial and retail hardware accounts.



Central Transformer Corporation Erecting New Pine Bluff, Arkansas, Fabricating Plant

Construction is now underway on this new 80,000 sq ft power and distribution transformer fabricating plant of the CENTRAL TRANSFORMER CORPORATION of Pine Bluff, Arkansas. Company expects to be completely situated in the building by fall.

Once in the new location, Central Transformer Corporation (formerly Larkin Lectro Products Corporation) will be able to enlarge its scope of

manufacture up to transformers of 10,000 kva, 115 kv primary class.

The new plant is located in the industrial section of Pine Bluff. Move to the new location has been carefully planned to minimize production delays. Architects are Ginocchio, Cromwell & Associates, Little Rock, Ark. FRANK NEWCOMBE is President of Central Transformer Corporation and PAUL GALTON, Sales Manager.

industrial
OIL AND GAS
BURNING
EQUIPMENT

- Mechanical Atomizing Oil Burners
- Steam Atomizing Oil Burners
- Low Air Pressure Oil Burners
- Rotary Oil Burners
- Industrial Gas Burners
- Combination Gas and Oil Burners
- Tandem Block Combustion Units
- Fuel Oil Pump Sets
- Refractory Burner and Muffle Blocks
- Valves, Strainers, Furnace Windows

Detailed information gladly sent you upon request.

NATIONAL AIROIL BURNER COMPANY, INC.

1279 E. Sedgley Ave., Philadelphia 34, Pa.
Southwestern Division: 2512 S. Blvd., Houston 6, Tex.

Pittsburgh Corning, Va.-Md.

N. GLASCOCK has been appointed sales representative for the PITTSBURGH CORNING CORPORATION in the WASHINGTON, D. C., BALTIMORE, NORFOLK and RICHMOND areas.



N. Glascock, Pittsburgh Corning's sales representative in the Eastern Virginia-Maryland area.

Mr. Glascock will supervise the distribution and sales promotion of FOAMGLAS Industrial Insulation. He will assist distributors of this product, and act as advisor to architects, engineers and contractors concerning its application. Mr. Glascock will be located at Box 348, Route No. 1, 8 Hamilton Street, Annandale, Virginia.

Hammel-Dahl Co., Oklahoma

THE HAMMEL-DAHL COMPANY of Providence, R. I., manufacturers of automatic control equipment, announces the appointment of JAMES E. DYER COMPANY of TULSA and OKLAHOMA CITY, OKLAHOMA, as additional sales and service representatives.

JAMES E. DYER and LEO E. JOHNS are located in the Tulsa Office, while JOE H. SALLEE is in charge of the Oklahoma City Office. All three members of the company are engineering graduates and have been associated with the petroleum industry for more than twenty years.

Warren Pumps — Baltimore

WARREN STEAM PUMP COMPANY, INC., Warren, Massachusetts, manufacturers of a complete line of centrifugal, reciprocating and rotary pumps, announce the appointment of J. F. MURRAY COMPANY, 100 East Pleasant Street, BALTIMORE 2, MARYLAND, as their representatives on Industrial Sales for the Baltimore area. This includes most of Maryland and sections of Virginia and West Virginia. Mr. J. F. MURRAY, head of the sales organization has specialized in this field for many years.

Reynolds Metals—Arkansas

REYNOLDS METALS COMPANY has awarded a joint general and mechanical contract for the construction of its ROBERT P. PATTERSON aluminum reduction plant at ARKADELPHIA, ARKANSAS, to DITMARS-DICKMANN-PICKENS CONSTRUCTION COMPANY, of LITTLE ROCK, ARKANSAS, and W. S. BELLWOS CONSTRUCTION COMPANY, of HOUSTON, TEXAS.

Work is expected to be completed by July 1, 1953. The new aluminum reduction plant will have a yearly capacity of 110,000,000 pounds of aluminum and will employ approximately 400 workers. J. W. Hutchinson is plant manager.

Insul-Mastic Southern Region

THE INSUL-MASTIC CORPORATION OF AMERICA, manufacturer of heavy coatings to protect metal, masonry and insulation from corrosive and other destructive elements, has named JOHN C. TYLER as its Southern Regional Manager, with headquarters in HOUSTON, TEXAS.

Mr. Tyler, a native Texan, was formerly associated with the Atlantic

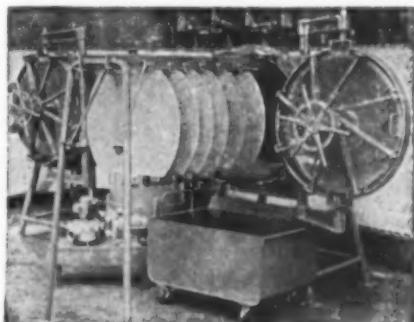
Refining Company, and later with the Industrial Waterproofing Company, the Insul-Mastic licensee in Houston. In his new position he will travel throughout the South and the Gulf Coast area, providing sales and technical assistance to the company's licensees in his territory.

New Westinghouse Alabama Plant Ships First Lamps

The first carload of 600,000 photo-flash lamps manufactured at the new REFORM, ALA., plant of the WESTINGHOUSE LAMP DIVISION was shipped recently.

The new plant, which began limited operations last June with a small staff of local employees, is part of the electric corporation's \$300,000,000 five-year expansion program begun in 1950.

Machine operators are trained successively in groups, and it is expected that 300 to 400 eventually will be employed at Reform, the only lamp-industry plant in Alabama. The Lamp Division also operates a new parts-manufacturing plant at PARIS, TEXAS, in addition to plants in KENTUCKY, ARKANSAS, and WEST VIRGINIA.



EMULSIFIED OR FREE OILS

Effectively Removed from Condensate with the

BLACKBURN-SMITH REFINER

OUTSTANDING ADVANTAGES

- 1. Breaks the tightest emulsion of oil in water
- 2. Reduces contamination to less than .1ppm.
- 3. Produces pure, clean condensate
- 4. Saves boiler tubes

Contaminated Condensate Formerly Wasted Can Now Be Re-Used After Filtration Through the Refiner

Proved in service . . . saves heat units and fresh water . . . no backwashing . . . reduces boiler maintenance costs . . . improves boiler efficiency . . . simple and inexpensive to operate . . . requires little space.

Write for catalog. Engineering assistance gladly furnished

THE BLACKBURN-SMITH MFG. CO., INC.

98 RIVER STREET, HOBOKEN, NEW JERSEY

Subsidiary of Condenser Service & Engr. Co., Inc.

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RECTOR 2-9360

news (continued)

Allis-Chalmers—Alabama

THE MOWBRAY ENGINEERING CO., GREENVILLE, ALA., has been named a certified service shop for ALLIS-CHALMERS transformers in portions of GEORGIA, MISSISSIPPI, ALABAMA and FLORIDA.

A. C. MOWBRAY is manager and owner of the concern, which was established in January, 1950.

Osgood Represents Reintjes

GEO. P. REINTJES COMPANY, 2517-19 Jefferson St., KANSAS CITY 6, Mo., announces that the sales of its arches for open hearth furnaces, soaking pit roof covers, and heat treating furnaces for steel and allied industries in the BIRMINGHAM and ATLANTA areas, will be sold by Mr. R. D. OSGOOD, associated with HARRY G. MOUAT, 544 American Life Bldg., Birmingham 3, Alabama.

Mr. Osgood has had many years of experience in steel mill operations. Only recently he has retired as Chief Engineer of the Tennessee Coal and Iron Company.



Nothing conveys an impression of quality and prestige more readily than a perfect business card designed by us.

A letter from you will bring an assortment of the business cards we have made for others.

THE JOHN B. WIGGINS CO.
636 So. Federal Street, Chicago 5

WIGGINS
Peerless Book Form
CARDS

Incentives-Education

(Starts on page 56)

tion at the lowest possible cost. That was the overall objective at which both programs were aimed.

"We saw that high production could not be accomplished solely by the use of new machinery. Nor could it be brought about by hiring more people; we had enough men and women, and they were already working two shifts a day—as they still are today. High production might be accomplished through lengthening the work day into overtime hours. But then it would become extremely high cost production.

"So our objective in the first case, then, became higher production from each employee.

"As for the second aim—reducing hazards and accidents—this might be brought about through the work of highly paid safety engineers. An extensive program of continual supervision over the men might do it. But in the end, both of these means would break down unless each employee cooperated wholeheartedly in keeping accidents to a minimum and avoiding altogether that bugaboo of box plants, fires.

"Therefore, our objective was to make the men and women who work for us want to do things the safe way, and want to save themselves and the plant from accidents which meant time and money lost for both workers and management."

Increasing production, then, would become a matter of making it to the employee's advantage to turn out more work. "Exhortations, pleadings and promises wouldn't do it," John Massengill points out. "But a definite advantage for the employee would.

"So that is the way our incentive pay plan was developed. To establish plus production, a standard work unit was set up. Meeting this work standard regularly was the employee's regular job. But if he surpassed it—he could make extra money.

"To give an illustration of how the incentive pay plan works, let us take a worker and pay figure—both fictitious, since I do not want

to personalize this with our employees' names or wages. Let's call the worker Joe Jones. Let's say that he makes a dollar an hour. As part of his regular work, he is expected to stamp so many boxes per hour. If he stamps more than that number, he gets a pay incentive based upon the number of extra units he has produced. Naturally, the ordinary work unit, and the basis for incentive pay, must differ from job to job and from machine to machine in the plant. That does it. The worker does an extra good day's work, and we pay him extra for it.

Safety

What of the Great Southern Box Company's fine safety record? "This, too, was an employee co-operation proposition," says the company's control manager. "We have tried to work it out—and succeeded notably—through an educational program.

"Once each week, a safety meeting is held. At this, the plant superintendent meets with a committee from the plant. They discuss—there's no lecturing in this program—prevailing safety problems. They bring up specific hazards and they talk about ways to eliminate the hazards.

"In almost every meeting, the matter of fire comes up. We haven't ever had one, and we confidently hope never to have a fire. But it pays to be prepared and to know what to do. In addition, going over the disaster plans, they ferret out fire hazards, and practices that are dangerous. They go over and over and over the ways of fighting different kinds of plant fires.

More Education

"Shortly, we will inaugurate an even fuller educational program. It will not only tackle safety and accident hazards, but production. We will look for better procedures and more efficient ways of doing each job. We intend to use movies for this training, since experience in colleges, in the Army and Navy, and in other plants has shown that visual education methods drive home the points better than other methods of teaching."

WHAT'S NEW and Where to Get It

Free literature on the latest developments in equipment and supplies is offered by leading manufacturers. For your copy, circle the item number on one of the reader service post cards provided on pages 17 and 18.

B-10 UNIT HEATER RATINGS—Bulletin No. 231, 8 pages—Lists Btu output rating for various models of 30 different makes of unit heaters. Tells how to figure condensing rates, how to select unit heater traps, and includes table for selecting traps and chart for determining heater output at various fan speeds. Physical data and prices are given.—ARMSTRONG MACHINE WORKS, Three Rivers, Mich.

B-11 HOOK-ON INSTRUMENTS—Booklet GEC-901, 8 pages—Describes complete line of hook-on instruments, including applications, operation, and basic features of the G-E hook-on type voltmeter, wattmeter, and power factor meter. Illustrated.—GENERAL ELECTRIC COMPANY, Schenectady 5, N. Y.

B-12 ROTARY PUMP SERVICE—Bulletin 100-2, 12 pages—Service Manual covers installation, operation and maintenance of rotary pumps. Discusses installing foundation bolts; alignment; supporting vertical pumps; grouting; piping; suction lines; hot liquid pumps; rotation, packing, dismantling, reassembly, starting, operation and standing idle. Illustrated with charts and drawings.—WARREN STEAM PUMP COMPANY, INC., Warren, Mass.

B-13 CONVEYOR BELTING—"Conveyor Belting Bulletin," 8 pages—Describes the company's conveyor belts and explains how B-G construction is designed to defeat major causes of belt failure, with explanatory illustrations. Includes belt selection tables and specifications, and discussion of belt protective equipment.—BARBER-GREENE COMPANY, Aurora, Ill.

B-14 RLM STANDARDS—1952 RLM Specifications Book, 44 pages—Contains detailed specifications for 18 most commonly employed incandescent and fluorescent industrial lighting units. Prepared for use of operating and maintenance engineers, utility lighting men, and others interested in proper planning of lighting for industrial plants.—RLM STANDARDS INSTITUTE, 326 W. Madison St., Chicago 6, Ill.

B-15 TURBINE-GENERATORS—Booklet B-5418, 20 pages—Describes six principal types of industrial turbines: non-condensing; non-condensing single-extraction; non-condensing double-extraction; condensing single-extraction; condensing double-extraction; and condensing. Discusses electrical power and process steam each type is capable of delivering. Illustrated with plant applications.—WESTINGHOUSE ELECTRIC CORPORATION, Box 2699, Pittsburgh 39, Pa.

B-16 BOILER-BURNER UNIT—A.I.A. File No. 24-R-1, 12 pages—Illustrates and describes Kewanee-Iron Fireman Boiler-Burner Unit for high or low pressure heating, power and process steam, with oil, gas, or oil-gas combination. Covers design, industrial applications, and engineering data.—IRON FIREMAN MANUFACTURING CO., 3170 W. 106th St., Cleveland 11, Ohio.

B-17 CENTRIFUGAL PUMPS—Bulletin 524M, 2 pages—Illustrates and describes the Model 4M "hy-weight" centrifugal pump, 1½ in. size, 4000 gph, designed for heavy duty service in a variety of industrial uses. Discusses automatic priming, built-in suction check valve, bellows-type cartridge shaft seal, direct line flow, non-clogging impeller, and other design features.—RICE PUMP & MACHINE COMPANY, Grafton, Wis.

B-18 HEAT EXCHANGERS—Catalog No. DM-1150, 28 pages—Discusses after-coolers, centrifugal pumps, gas coolers, heat exchangers, oil pre-heaters, refrigeration

equipment, tank suction heaters, and water heaters. Applications and basic design of heat exchangers are covered, with instructions for installation, operation, and maintenance.—BELL & GOSSETT COMPANY, Morton Grove, Ill.

B-19 SPREADER STOKERS—Form F-520-A10M, 14 pages—Intended to help in selection of spreader stokers for industrial use. Points out factors for consideration by the buyer in order to get the most for his investment. Discusses design, operation, and application. Illustrated with engineering drawings and photographs of several typical plant installations.—AMERICAN ENGINEERING CO., Aramingo Ave. and Cumberland St., Philadelphia, Pa.

B-20 MATERIALS HANDLING—Bulletin No. 198, 8 pages—Illustrates and describes the company's line of overhead transportation systems and related equipment, including Tramrail cranes and transfer bridges. Sections are devoted to detail and dimensions of track, headroom, load and span requirements. Photographs show actual plant installation.—THE FORKER CORPORATION, 2644 Random Road, Cleveland 6, Ohio.

B-21 COMPOUND TRAPS—Bulletin No. 215, 8 pages—Covers purpose, operation, physical data, capacities, installation, and prices of piston-operated compound traps

designed for use on equipment producing large amounts of condensate, such as purifiers, separators, evaporators, etc.—ARMSTRONG MACHINE WORKS, Three Rivers, Mich.

B-22 ADHESIVES AND COATINGS—Booklet, 8 pages—Shows up-to-date uses for "3M" adhesives, coatings, and sealers in industry, including adhesives for holding plywood to metal, rubber to metal, and vinyl to wood; coatings for anti-corrosion protection, smoothness and safety; and sealers for fuel tanks, and other plant applications.—MINNESOTA MINING & MANUFACTURING CO., 411 Piquette Ave., Detroit 2, Mich.

B-23 RECIPROCATING COMPRESSORS—Bulletin M-70, 44 pages—Provides basic application data with design specifications on the company's line of reciprocating compressors from 100 hp to 5,000 hp. Illustrated with photographs of specific plant applications, line diagrams, and cut-away views of equipment.—THE COOPER-BESSEMER CORPORATION, Mount Vernon, Ohio.

B-24 INDUSTRIAL PUMPS—Bulletin 52, 4 pages—Contains details and specifications of models from the 2 in., 7,000 gph size, to the 4 in., 40,000 gph portable, self-priming centrifugal pumps. Design improvements are discussed. Illustrated with equipment photographs and line drawings.—RICE PUMP & MACHINE COMPANY, Grafton, Wis.

B-25 EXPANSION JOINTS—Catalog CMH-127R, 16 pages—Describes types of corrugated expansion joints and discusses the basic theory behind expansion joint design. Gives specification and installation data. Illustrates the company's expansion joints for low pressure applications, for absorbing greater amounts of traverse, integral-ring expansion joints for extremely high pressure applications.—FLEXONICS CORPORATION, 1371 South Third Ave., Maywood, Ill.

(Continued on following page)

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B-30 INDUSTRIAL FANS—Bulletin BA-6872, 12 pages—Describes new fan for general purpose industrial applications such as exhausting fumes, gases and smoke; removing metal dust, chips and sawdust; pneumatic conveying of fibrous and granular materials; circulation in ovens, heat treating furnaces and dryers; process and product cooling, and other air handling applications.—WESTINGHOUSE ELECTRIC CORP., STURTEVANT DIVISION, Hyde Park, Boston 36, Mass.

B-31 LUBRICATORS—Catalog L-52, 16 pages—Describes force feed lubricators for all types of machinery. Gives full details on the company's open and enclosed type lubricators, available in capacities from 2 pints to 32 pints with to 24 feeds per unit. Illustrated.—HILLS-McCANN CO., 3025 N. Western Ave., Chicago 18, Ill.

B-32 FLOW METERS—Bulletins No. 704 and 8-15—Describe pneumatic electronic flow meters especially designed to mea-

sure widely fluctuating flows, dirty fluids, corrosive fluids, viscous or vaporous liquids, inflammable, toxic and other dangerous fluids; and the pneumatic positioning operator designed for accurate, high speed positioning and regulating of heavy equipment.—REPUBLIC FLOW METERS CO., 2240 Diversity Parkway, Chicago 47, Ill.

B-33 MOBILIZED PIPE CLEANING—Bulletin, 6 pages—Describes the hydraulic pipe cleaning method with step by step photographs explaining procedure. Applications in water pipe and sewer pipe cleaning are discussed. Specific list of typical jobs recently completed.—ACE PIPE CLEANING CONTRACTORS, INC., 2003 Indiana Ave., Kansas City, Mo.

B-34 INDUSTRIAL FURNACES—Bulletin No. 131, 8 pages—Describes gas-fired and electric industrial furnaces. Operation, design features and the wide range of uses for annealing, normalizing, tempering, nitriding and special heating are explained. Photographs, diagrams, and specification charts are included.—LINDBERG ENGINEERING COMPANY, 2450 West Hubbard St., Chicago 12, Ill.

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Preventive Maintenance for Motors

(Starts on page 59)

that they are running cool. Note whether the oil rings are turning, and take notice of whether there are any indications of oil leaks. Add oil if necessary, but not too much. Also check ball and roller bearings to see that they are not overheating, and listen for unusual noise that might indicate need for attention in advance of the yearly schedule.

Wipe the motor clean, and if the motor is in a dusty place, clean the windings. Dry low pressure air may be used for blowing off any loose dirt, but any metallic dust should be removed by suction.

Check controls to see that fuses are in good condition. Clean the control housing. Examine the

brushes and check the commutator and make adjustments if needed.

Semi-Annual:

On a six months schedule the following items should normally be included. Flush out bearing housing and provide the correct amount of the proper lubricant. Check bearings for wear and end play. Test the air gap clearance with a feeler gage. Note the readings on the work order. Replace worn out brushes, and correct spring pressure if needed. Make sure the brushes ride properly in the holder. Check motor base bolts and see that they are tight. Check motor alignment and belt adjustment.

It is also advisable to recheck the motor load every six months. Overloaded motors cause failures and short insulation life.

After the inspection, make sure that all guards and seals are properly replaced. This is part of the program of protecting equipment and human life.

Yearly

Dismantle the motor and really give it a thorough cleaning. Paint windings with a good grade of insulating varnish. Clean bearing housings and replace lubrication for sleeve bearings. Determine whether or not anti-friction bearings need servicing. Check moving parts for wear, and armature and wiring for connections. See that air passages are clean, and air gaps are correct. Repaint the motors if necessary.



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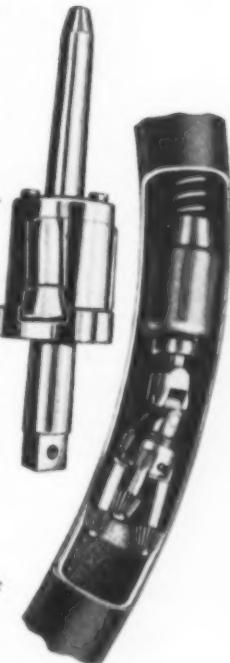


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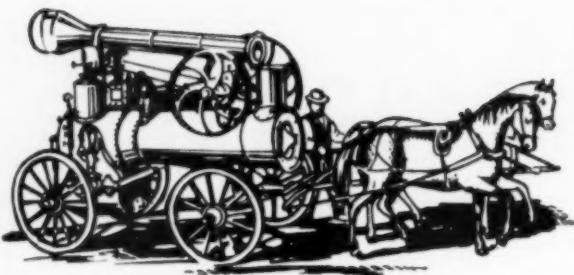
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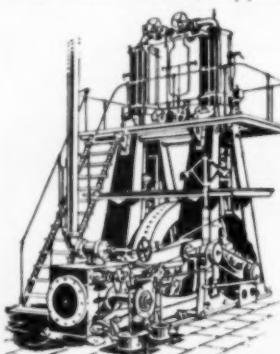


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EQUIPMENT

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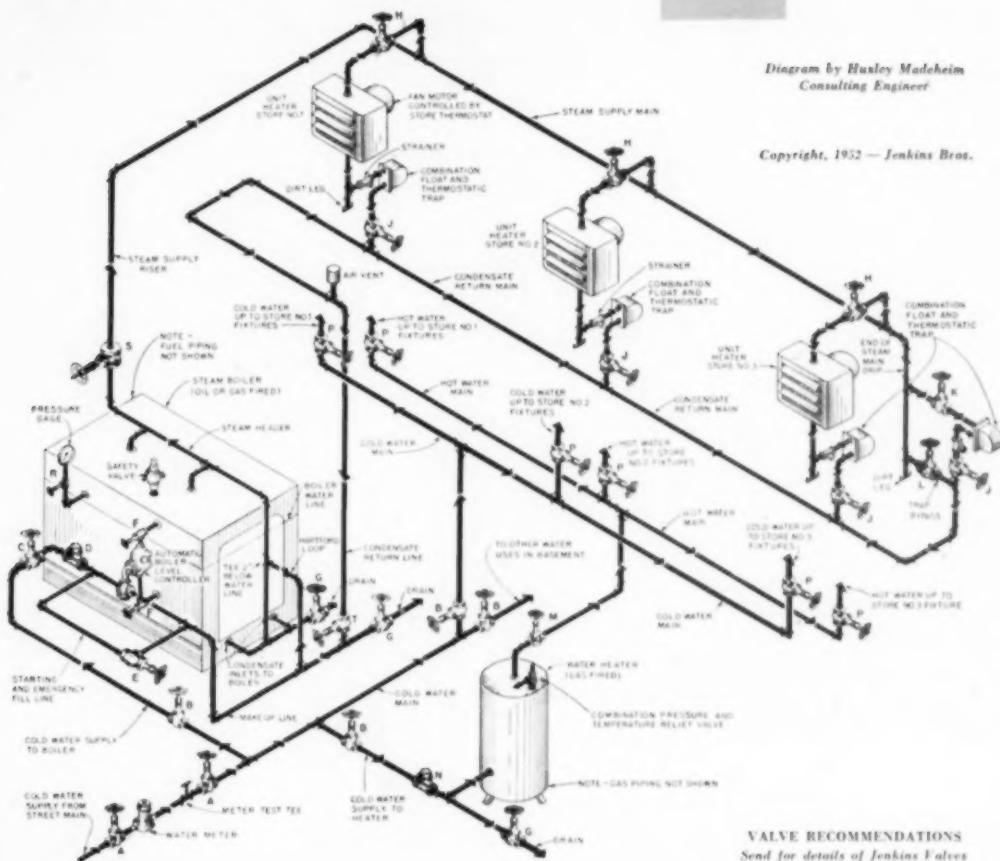
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How to plan PLUMBING AND HEATING IN A SMALL TAXPAYER BUILDING

The one-story "taxpayer" building developed with the movement of shopping centers to suburban areas. Constructed with or without a basement, it houses retail stores, service establishments, amusement centers, restaurants and offices.

Heating and plumbing requirements of such a building are usually provided by the owner, whose main interest is economy and trouble-free operation. An oil or gas fired steam boiler with automatic controls, and a separate gas fired heater for hot water supply, as illustrated, is commonly used.

The two-pipe heating system, located in the basement, utilizes unit heaters hung from the ceiling to save space. Individual thermostatic controls assure fuel savings and even heating. A further refinement of the control system would include an automatic shutoff or modulator valve on

the steam line just ahead of each heater, and an aquastat in the condensate return line from each heater. Piping is simple in such an installation and standard-type valves are used.

Consultation with accredited piping engineers and contractors is recommended when planning any major piping installation.

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VALVE RECOMMENDATIONS

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A	2	Fig. 370 Bronze Gate	Water Service Shutoff
B	4	Fig. 370 Bronze Gate	Distribution Shutoff
C	1	Fig. 106 A Bronze Globe	Water Supply to Boiler
D	1	Fig. 92 Bronze Swing Check	Prevent Boiler Backflow
E	1	Fig. 108 A Bronze Angle	Emergency Boiler Fill
F	2	Fig. 108 A Bronze Angle	Level Controller Shutoff
G	3	Fig. 106 A Bronze Globe	Drains Shutoff
H	3	Fig. 106 A Bronze Globe	Steam Supply to Heaters
J	4	Fig. 370 Bronze Gate	Condensate Drain Shutoffs
K	1	Fig. 106 A Bronze Globe	Steam Main Trap Connection
L	1	Fig. 106 A Bronze Globe	Trap Bypass
M	1	Fig. 47 U Bronze Gate	Hot Water Heater Shutoff
N	1	Fig. 92 Bronze Swing Check	Prevent Water Heater Backflow
P	6	Fig. 370 Bronze Gate	Water Supply Shutoffs
R	1	Fig. 743 G Bronze Needle	Pressure Gauge Control
S	1	Fig. 651 1 B.B.M. Gate	Steam Main Shutoff
T	1	Fig. 370 Bronze Gate	Return Shutoff

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